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The Relationship Between Participation in Recreational Therapy Physical Activity and Symptoms of Mental Health Issues in Veterans

Krista F. McDonagh

THE RELATIONSHIP BETWEEN PARTICIPATION IN RECREATIONAL THERAPY PHYSICAL ACTIVITY AND SYMPTOMS OF MENTAL HEALTH ISSUES IN VETERANS

A Dissertation Presented
by
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ABSTRACT

THE RELATIONSHIP BETWEEN PARTICIPATION IN RECREATIONAL THERAPY PHYSICAL ACTIVITY AND SYMPTOMS OF MENTAL HEALTH ISSUES IN VETERANS

August 2021

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Background/Objective: The growing prevalence of mental health issues in veterans has triggered a wide-spread effort to identify and provide complementary intervention strategies to increase help-seeking behavior in this population. Posttraumatic stress disorder (PTSD) and substance use disorders (SUD) have become two of the most common mental health issues as a result of the demanding environment of military life. This study looks specifically at therapeutic recreation-based physical activity opportunities as a complementary treatment option for veterans at an increased risk for mental health issues.

Method: A correlational survey research design was used to examine relationships between factors of participation in different types of physical activities and three psychosocial measures for veterans at an increased risk of mental health issues: self-perceptions of

depression, anxiety, and health-related quality of life (HRQoL). For physical activities, frequency, duration, intensity, and preference of sessions of traditional indoor fitness, outdoor adventure therapy, or mind-body practices were measured. A total of 102 participants completed an online survey.

Results: Significant negative correlations were found between physical activity and depression, specifically, the frequency of traditional indoor fitness sessions per week ($p < .001$), the duration of traditional indoor fitness sessions ($p < .001$), the number of outdoor sessions ($p = .002$), the number of overall sessions ($p = .001$), the frequency of strenuous sessions ($p = .021$) and the frequency of outdoor adventure therapy sessions ($p < .001$). Significant positive relationships were also found between physical activity factors and both physical and total HRQoL, specifically, the number of traditional indoor fitness sessions per week ($p = < .001$), the duration of indoor fitness sessions ($p < .001$) and the number of strenuous sessions for physical HRQoL ($p = .002$) and total HRQoL ($p < .001$). There were also positive significant relationships found between the frequency of outdoor adventure therapy sessions and total HRQoL ($p < .001$) and the duration of sessions and mental HRQoL ($p < .001$).

Conclusions: According to this study, traditional fitness and activities of strenuous intensity levels were associated with lower depression scores and overall higher HRQoL. Recommendations for future intervention studies are made to continue to find effective, evidence-based treatment for veterans with mental health issues.

DEDICATION

I would like to thank and dedicate this work to everyone who has contributed to and supported me throughout this journey.

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CHAPTER I

INTRODUCTION

Today there are approximately 22.6 million veterans of various wars and conflicts, and approximately 5.5 million have a service-connected disability, with diagnoses of psychological, physical, and neurological injuries continuing to rise (U.S. Department of Veterans Affairs [USDVA], 2016). In 2018, more than 1.7 million veterans received mental health treatment in a VA specialty program. The increase of mental health issues in veterans has led to a widespread effort to expand services and provide these individuals with more options of care. Of these illnesses, posttraumatic stress disorder (PTSD) and substance use disorders (SUD) have become two of the most common mental health issues for individuals worldwide, many of them being veterans who have experienced exposure to war and combat. On average, one out of every three veterans seeking treatment for SUDs also has PTSD (USDVA, 2017). The effects of PTSD and SUDs among veterans have adverse consequences on their physical and mental health including higher prevalence of other issues, such as increased depression and anxiety and lower health-related quality of life (HRQoL).

Veterans are a multifaceted population with a set of unique challenges and a culture of their own. Understanding their specific medical needs is critical in identifying effective intervention strategies for increasing their overall. HRQoL is not merely a description of one's status, but the perceived personal view of current health status, as well as other aspects of his or her life (Office of Disease Prevention and Health Promotion [ODPHP], 2018). It is

inclusive of positive experiences and social indicators of people's lives, such as the quality of social and personal relationships, emotions, resilience, and participation in society. These attributes contribute to numerous benefits related to not only health, but work, family, and economic well-being. HRQoL is a multidimensional aspect of a person's overall quality of life (QoL) that affects both mental and physical health. Specific to the veteran population, what experiences they may have faced during or after their military service may contribute to poorer mental and physical health, leading to more negative perceptions of their current HRQoL.

Veteran mental health concerns, such as PTSD, SUDs, and depressive and/or anxiety disorders are complex and require additional and complementary interventions to the traditional treatment practices previously provided. The Department of Veterans Affairs (VA) provides treatments for these types of problems, along with other mental and physical health issues, to veterans and their families. However, there is evidence that many of these veterans seek alternate care for their health issues, outside of the VA system, due to fear of stigmatization. Stigma in the military context is regarded as a process in which service men and women perceive or internalize a "brand" or "marked" identity about themselves or anyone with a mental health disorder (Acosta et al., 2014). Stigma has been empirically linked to four immediate outcomes that help to create it, and the outcomes associated with it: (a) coping mechanisms (hiding or withdrawing); (b) interpersonal outcomes (self-esteem); (c) attitudes toward treatment-seeking; and (d) intentions to seek treatment (Acosta et al., 2014).

Reducing stigma associated with mental health issues, specifically in the military population, would ultimately serve as an important effort to increase help-seeking behaviors

from those who need it (Acosta et al., n.d.). While stigma may not currently be declining at a pace as fast as most would like, alternative non-clinical treatment options can be offered as effective interventions for those who need assistance. There has been an increase in individuals, more commonly those in the military community, seeking complementary and integrative health (CIH) options for mental health needs (Walker & Pacik, 2017). According to the National Center for Complementary and Integrative Health (NCCIH), CIH can be described as diverse medical and health care interventions, practices, products, or disciplines that are not considered part of conventional medicine. It is defined as being used in conjunction with other conventional treatment approaches (complementary) and, instead of conventional interventions (alternative). The NCCIH most often uses the term "complementary" when discussing practices and products of non-mainstream origin, and "integrative" when referring to using complementary approaches in conjunction with mainstream health care. While the evidence base is limited, research on these integrative approaches is growing.

Within the military health system, CIH interventions are used to address issues in the management and treatment of stress, mental health problems such as PTSD, depression, chronic pain, arthritis, headache, fibromyalgia, and SUDs, as well as to promote general wellness, specifically for veterans (USDVA, 2017). National trends have even shifted focus in the VA to include complementary or alternative approaches that focus on holistic and integrative techniques (Gaddy, 2018). The most used interventions are stress management/relaxation therapy, acupuncture, progressive muscle relaxation, guided imagery, chiropractic, and mindfulness meditation (Herman, Sorbero, & Sims-Columbia, 2017). While

these types of therapies are usually offered, more active, physical activity interventions are an additional type of CIH, and have become more common and increasingly used among the military population (USDVA, 2017; Walker & Pacik, 2017). According to the Physical Activity Guidelines Advisory Scientific Report (2018), physical activity is inclusive of the full range of bodily movements, from competitive sport and exercise to active hobbies, walking, cycling, or activities of daily living. It encompasses all types, intensities, and domains of movements, and does not require or imply any specific aspect of energy expenditure. It can also be defined as "any bodily movement produced by the skeletal muscle that results in an increase in metabolic rate over resting energy expenditure," according to Caspersen, Powell, & Christenson (1985).

Physical activity interventions may present as treatment options with fewer stigmas than those in traditional medical settings. They may be seen as less threating, specifically because they can be done without the supervision of a mental health professional, can be done at home, and are more accepted in the community (Whitworth & Ciccolo, 2016). These interventions can be done at little to no cost, at one's own convenience, and may produce similar results to those that they may receive in a more clinical setting. Results from previous studies have indicated that approximately 39% of veterans in a nationally representative sample used CIH to address mental health needs; in particular, programs that utilized mind-body practices such as relaxation, meditation, and yoga (Strauss, Coeytaux, McDuffie, Nagi, & Williams, 2011). Many veterans fear social consequences of mental health services, and exercise and physical activity opportunities are valued behaviors among the military culture, providing a need for further investigation of effective complimentary treatment modalities.

Research has documented mental and physical health improvements using recreational therapy (RT) programs as complementary intervention strategies. RT plays an important role in the support and rehabilitation of the veteran population, focusing on helping to improve their functional capacity and promote independence (Townsend, Hawkins, & Bennett, 2015).

Historically, RT has served veterans for over 150 years, since the first federal veterans' facilities were established after the Civil War (Petersen, 2016). It began through the National Home for Disabled Volunteer Soldiers to assist those returning from war improve their mental states through recreational and physical activity opportunities. Since then, RT has grown in the VA system as a CIH treatment that uses an individualized and holistic lens to assist those who have conditions or issues that may be inhibiting rehabilitation recovery, or those who may resist other traditional treatment approaches due to barriers.

RT has shown to be effective in assisting recovering military service members in the psychological, social, cognitive, physical, and spiritual realms (Hawkins, Townsend, & Garst, 2016). For example, Hawkins, Cory, & Crowe (2011) interviewed service members with physical injuries who attended a three-day Paralympic sports camp. Veterans were able to participate in cycling, strength and conditioning, archery, volleyball, swimming, track and field, and rowing. Results indicated that social interaction with other service members during the weekend motivated them personally and to continue participation in other activities, leading to improved health and well-being. Additionally, in a study conducted by Carter et al. (2013), researchers found that participation in a five-month yoga intervention program had a significant positive impact on PTSD and depression scores in veterans with PTSD.

The goal of RT is to restore and rehabilitate individuals to their highest level of functioning, as well as promote health and wellness to reach optimal QoL (American Therapeutic Recreation Association [ATRA], 2018). It is a modality for positive change that focuses on a strengths-based approach, which is complementary and practical to the key elements of mental health and substance use recovery (Iwasaki, Coyle, & Shank, 2010). RT programs aim to treat the whole person, providing a more balanced approach to the rehabilitation process. A holistic strengths-based approach helps to provide the groundwork for RT interventions as a CIH practice.

The benefits of outdoor recreational interventions are also becoming more popular as CIH treatment options, both with civilian and veteran populations. While still underrepresented within this body of research, more studies have begun to examine the effects of nature's ability to improve veteran's total HRQoL and provide a supportive environment for alleviation of symptoms related to mental health issues they may be experiencing (Caddick & Smith, 2014). Specifically, adventure-based interventions, such as hiking, kayaking, surfing, climbing, etc., seem to align with veterans' physical and psychological interests and needs. For example, a study by Hyer, Boyd, Scurfield, Smith, and Burke (1996) looked at the effects of Outward Bound, an outdoor therapeutic program aimed at helping veterans with mental health address symptoms of PTSD. Results showed that there was a significant difference across three domains (self-esteem, emotional control, and social connectedness) from the control and experimental group of veterans who participated in the program. In addition, research by Rogers, Mallinson, and Peppers (2014) showed clinically meaningful improvement in PTSD and severity of depressive symptoms for ten veterans with

PTSD who participated in a five-week experiential skill-based surfing. Similarly, in a study conducted by Vella, Milligan, and Bennett (2013), results indicated that participation in a two-day, three-night outdoor fly-fishing event provided effective means of improvement in psychosocial well-being of veterans with PTSD. Participation in active, physical types of activities enable veterans to work towards accomplishing goals of being mentally and physically fit, an important aspect in the identity of military personnel (Scheinfeld & Spangler, 2016).

Statement of the Problem

While there is a growing number of studies that examine the benefits of exercise and physical activity on veterans with mental health and substance use issues (Caddick & Smith, 2014; Bennett, Piatt, & Van Puymbroeck, 2017), there is a gap in the literature related to those at an increased risk for both of these conditions, along with heightened depression and anxiety, and the most effective types of activities and related factors, specifically frequency, intensity, and duration of those opportunities which lead to the most improvement in total HRQoL of this population (Whitworth & Ciccolo, 2016; Babson et al., 2015). To estimate the amount of physical activity performed, these factors must be quantified as shown in table 1.

Table 1

Quantification of Physical Activity Factors

Frequency	Number of sessions completed during a specific time (i.e. one day, two days, etc.).
Duration	Amount of time (in minutes) an individual spends participating in one session of physical activity.
Intensity	The amount of energy used by the body per minute of activity.

Linke & Ussher (2015) examined current research and summarized factors related to the effects of exercise-based treatments for SUDs. One of their conclusions stated that research has yet to identify the optimum frequency and dose of exercise for individuals with SUD. Additionally, in a meta-analysis review of physical activity in the treatment of PTSD, researchers concluded that it was not possible to determine optimal frequency, intensity, type, or time of physical activity for people with PTSD (Rosenbaum et al., 2015). While the literature supports the benefits of an active lifestyle on the mental and physical health of individuals, the lack of attention from clinical providers, including RT physical activity opportunities as CIH, presents a missed opportunity to provide an effective treatment for those who do not seek help due to barriers regarding stigmatization.

Collectively, the existing body of research regarding the effects of physical activity suggests that it is a promising alternative and integrative treatment approach, but there is still limited institutional support for programs to suggest these types of programs as a means of health promotion (Morey et al., 2018). While specifics of optimal types, frequencies,

intensities, durations, etc. are still in need of additional research, the current body of literature supports the idea that physical activity interventions can be just as effective as traditional treatments for mental health issues, posing a need for health systems to create the necessary infrastructure to ensure physical activity opportunities can be used as alternative and complementary modalities of treatment (Pedersen & Saltin, 2015). This study was conducted to help to determine which, if any, RT activity is best conceptualized as a stand-alone intervention, integrative treatment, or both for veterans at an increased risk for mental health and substance use issues.

Thus, the purpose of this correlational study was to examine the relationships between various factors of participation in specific types of RT physical activities, such as activity type, frequency, duration, and intensity, and three psychosocial measures for veterans at an increased risk of PTSD and SUD: depression, anxiety, and HRQoL. By examining these relationships, the hope was to predict the strongest combinations of participation factors that would correlate with the healthiest self-perception ratings of mental health, thereby enhancing the recovery process.

Research Questions

- RQ1: What are the relationships between frequency and duration of participation in different types of RT physical activities (traditional indoor fitness, outdoor adventure therapy (AT), and mind-body practices) and self-perceived ratings of mental health (depression, anxiety, and HRQoL)?

- RQ2: What is the relationship between the frequency of sessions participating in activities of various intensity levels (strenuous, moderate, or mild) and self-perceived ratings of mental health (depression, anxiety, and HRQoL)?
- RQ3: Are there significant differences in self-perceived ratings of mental health (depression, anxiety, and HRQoL) with respect to the type of RT physical activity that participants prefer to engage in the most (traditional indoor fitness, outdoor adventure therapy, and mind-body practices).

Background of the Problem

U.S. veterans represent a particularly vulnerable population, as they have provided a service to the nation that many others have not and have been faced with the demanding environment of military and/or combat life. While military members are typically more active during their time of service than their civilian counterparts, the stressors of combat and deployments, especially more than once, can decrease the benefits of the advantages an active lifestyle can have (Goodrich & Hall, 2018). Literature is growing that supports increases in morbidity following multiple deployments in the military community (Bleier et al., 2011). Following these longer, multiple deployments, veterans often do not have adequate time to recover, and are at a higher risk for poorer health outcomes following their return home. Bleier et al. (2011) examined the relationship between the impact of the duration and frequencies of deployments on PTSD, anxiety and depressive disorders, alcohol misuse, suicide post-deployment and relationship conflict in the Australian Defense Force (ADF). In a survey of 5,911 former ADF personnel, results indicated that one deployment had greater odds of reporting more psychological symptoms and perceived general health as

poor, fair, or good (compared to very good or excellent) than no deployments, and similarly in at least two deployments compared to no deployments (Bleier et al., 2011).

Stressors of multiple deployments and similar types of situations can include separation anxiety from their homes and family members, living in austere conditions, poor health services, extreme temperature variables, and being exposed to other hazardous and potentially traumatic experiences. Because of psychological distress that may arise from these experiences, many veterans develop mental health issues that negatively impact their lives (Substance Abuse and Mental Health Services Administration, 2017). In part to the large number of combat and noncombat–related stressful situations veterans may experience; they are at an increased risk for reckless and self-destructive behaviors. Specifically, they may lose inhibition and seek the assistance of unhealthy coping strategies to alleviate the pain and distress they may be experiencing, such as substance use, heavy drinking, and smoking (Goodrich & Hall, 2018). Inhibition is a necessary higher-order cognitive function that is essential for self-control, impulse control and decision making (Sadeh et al., 2015). Veterans who have been exposed to multiple stressors often lose their response inhibition, and have difficulty keeping control and restoring their functional abilities.

Disinhibition has been linked to mediate associations between stress, PTSD and substance-related problems, especially in the military population (Simons et al., 2017). Impaired inhibition has been identified as a potential vulnerability for the development of PTSD and SUD overtime, and has been linked to increasing symptoms of the diagnoses, such as re-experiencing, hyperarousal, and fear responses (Sadeh et al., 2015). Due to exposure unique to this population, and the range of individual, social, psychological, and physical

health needs attributed to these experiences, considerable work has been devoted to identifying the health disparities between this vulnerable population and their civilian counterparts (Goodrich & Hall, 2018).

Mental health issues have been researched and found to be extremely common and debilitating in military veterans (Goodrich & Hall, 2018). Medical records reveal that of the one in three patients who were diagnosed with at least one mental health disorder, 41% were diagnosed with either a mental health or behavioral adjustment disorder (Olenick, Flowers, & Diaz, 2015). In many cases, veterans diagnosed with one condition were 80% more likely to meet diagnostic criteria for another disorder than their civilian counterparts (Whitworth & Ciccolo, 2016). Of these mental health issues, the most reported diagnoses are PTSD, anxiety, and depression, all of which may be further exacerbated by substance use (Olenick et al., 2015).

PTSD is highly comorbid with several other medical conditions, to include major depressive disorder, anxiety disorders and SUD (Olenick et al., 2015). Despite the high report and diagnoses rates of mental health issues among the veteran population, there is still a large gap in the utilization of mental health services; with an estimation of only approximately one third seeking the help they need (Scheinfeld, Rochlen, & Russel, 2016). This lack of help-seeking behavior, combined with the prevalence of mental health problems among veterans, is evidence of the need for additional, complementary and integrative interventions with fewer stigmas to address these increasing issues, such as RT physical activities.

With its growing research support, RT physical activity programs are proving to be effective as alternative or complementary types of interventions with fewer stigmas for individuals with mental health issues, specifically veterans (Gelkoph, Hasson-Ohayon, Bikman, and Kravetz, 2013). Traditionally, psychotherapy, stress inoculation training (SIT), and pharmacotherapy treatment options are often offered as a first-line defense for veterans with PTSD and SUD (USDVA, 2018). Psychotherapy interventions typically include trauma-focused therapies, which are inclusive of components that expose the individual to experiences that are causing traumatic life events provided on an individual basis. The most well-established psychotherapy interventions are prolonged exposure, cognitive processing, and eye-movement and desensitization and reprocessing (EMDR). SIT protocols are theoretically grounded in cognitive behavioral techniques of change and focus on anxiety management and coping skills to "inoculate" against heightened stresses responses (Strauss et al., 2011). Pharmacotherapy treatment options mainly take on Selective Serotonin Reuptake Inhibitors (SSRIs) and Serotonin Norepinephrine Reuptake Inhibitors (SNRIs), which currently are the only evidence-based recommendation medication classes for PTSD treatment (USDVA, 2018). These types of interventions commonly hold notions of stigma, holding back veterans from seeking the help they need. In conjunction with these common, clinical-based treatments for PTSD, SUD and other mental health issues, participation in RT may present as an intervention strategy to help circumvent many of the barriers veterans face to seeking treatment (Gelkoph et al., 2013).

Theoretical Framework

To fully understand the conceptualization of RT physical activity and its effects, it is important to identify and understand the psychological influences and theoretical approaches that affect it. The theoretical basis for this research is formed around the HRQoL model and how it applies to the concept of RT physical activities. The rationale for this theory is based on veterans' self-perceptions and interpretation of HRQoL, and how that understanding influences the choices they make on participation in activities that influence mental and physical health.

Health-Related Quality of Life

HRQoL goes beyond basic measures of health, life expectancy, and death, and includes the multidimensional aspect of domains related to the physical, mental, emotional, and social functioning of an individual (ODPHP, 2018). It assesses how positive influences in one's life impacts health status and well-being, and helps to measure effects of chronic illness, treatments, and short- and long-term disabilities.

While methodological development in this area of study is still ongoing, there have been several HRQoL conceptual models used to guide research in many fields throughout the years (Bakas et al., 2012). They have been applied throughout different health and illness conditions across the lifespan and among individuals, their families, and communities. One of the most used models is that of Wilson and Cleary (1995), which integrates biomedical and social science aspects of health. Their model identifies five levels of HRQoL: (a) biological and physiological factors; (b) symptoms; (c) function; (d) general health

perception; and (e) overall QoL. Each of these domains is linked where reciprocal relations may exist (Bakas et al., 2012).

HRQoL will be used as a guiding framework for this study as it builds on the concept of other quality of life models. It has been proven to be useful across a variety of disciplines, and as a global concept, which can help to identify at-risk populations for morbidity, premature mortality, and in need of intervention (Oppezzo et al., 2016). Veterans have self-reported substantially worse HRQoL, and mental and physical health status comparable to their civilian counterparts (Raab, Mackintosh, Gros, & Morland, 2015). This may in part be contributed to service-related trauma exposure, debilitating pain, socioeconomic status (SES) indicators, race/ethnicity, subjective self-rated SES (perceived social status in one's community), and/or substance use issues (Oppezzo et al., 2016).

Individuals at an increased risk for mental health disorders, such as PTSD and SUDs, especially in the veteran population, are at an even higher risk for lower rates of HRQoL (Benaiges, Prat, & Adan, 2012). With the special considerations of this vulnerable group, they are also at a greater risk for faster relapse, higher rates of re-hospitalization and imprisonment, lower participation in health services, and more loss of social support and financial problems (Benaiges et al., 2012). Through tracking HRQoL outcomes in populations such as veterans, it can bridge boundaries between disciplines and between different services. It can help to provide insights into the relationships between HRQoL levels and other important risk factors, such as preventable diseases, injuries, disabilities, and illnesses.

Posttraumatic Stress, Depression, and HRQoL

It has been established that both PTSD and depression are associated with lower measures of HRQoL (Pittman, Goldsmith, Lemmer, Kilmer, & Baker, 2012). Both are often negatively correlated with physical and mental health outcomes, especially in combat veterans (Pittman et al., 2012). Having to manage symptoms of both diagnoses can be a life-long struggle in maintaining HRQoL. Regarding social-material conditions, PTSD is highly correlated with unemployment rates, homelessness, and marital instability (Schnurr et al., 2009). There have been several studies that show PTSD negatively affects functioning across a variety of domains including social and interpersonal, marital, parental and familial, and occupational. For example, Hoge et al. (2008) found that veterans who experienced an injury with loss of consciousness were more likely to miss more than two workdays due to illness that those with other injuries, but PTSD and depression mediate the relationship between injury and work loss. This relationship can be explained partly due to exposure to the extreme stress and physical toll traumatic experiences can have, especially when associated with loss of consciousness.

Additionally, Pietrzak et al. (2010) examined the relationship between functioning and PTSD symptom severity in a survey of veterans who served in the National Guard, and found that the severity of the symptoms, rather than the diagnosis, was associated with psychosocial difficulties at home, work, and school. Lastly, in a study conducted by Rapaport, Clary, Fayyad, & Endicott (2005), results showed the association between PTSD and lower life satisfaction and well-being in almost six out of ten treatment-seeking civilians

with PTSD. It showed that these individuals had clinically severe reductions in overall life satisfaction, comparable to that of those with major depression alone.

Individuals diagnosed with PTSD are more susceptible to the consequences of poor QoL, such that they are at a higher risk for developing other mental health disorders (Schnurr et al., 2009). There is a higher chance they may develop other anxiety disorders, depression, eating disorders, and/or SUDs. There is also a higher risk for physical health issues such as obesity, diabetes, heart problems, and other chronic problems (Schnurr et al., 2009). Many of these conditions are linked to unhealthy lifestyle behaviors, therefore posing a need for interventions that support healthy approaches such as physical activity and exercise (Zschucke, Gaudlitz, & Ströhle, 2013).

Exercise and HRQoL

There are many positive factors that are associated with higher levels of HRQoL, such as regular aerobic exercise, adequate sleep, healthy eating habits, and limited or no use of harmful substances, such as drugs or alcohol (Oppezzo et al., 2016). Additional determinants, such as positive affect, psychological skills and assets, and high levels of positive emotions also have been linked as clinical factors that can enhance an individual's HRQoL (ODPHP, 2018).

Through identification of these health-supporting behaviors, it can help to inform future interventions to support positive mental and physical health, and influence HRQoL in a healthy way. In a study of veterans in an addictions treatment center conducted by Oppezzo et al. (2016), results indicated that regular exercise assessed alone as a health-supporting behavior was associated with higher psychological and physical QoL and well-being.

Strengths of the HRQoL

Due to its impact on domains that reach beyond the generic aspects considered health, such as income, freedom, and quality of environment, measuring HRQoL is important because it helps to assist in identifying factors that contribute to individuals with the same clinical criteria having different responses (Guyatt, Feeny, & Patrick, 1993). HRQoL focuses on domains related to physical, mental, emotional, and social functioning (Centers for Disease Control, 2016). As such, this framework falls in line with RT that supports and focuses on holistic, strengths-based approaches to care to improve active living and recovery in individuals with mental health issues to improve their overall QoL (Iwasaki et al., 2010). For example, utilizing this type of approach recognizes that internal and external strengths are key factors in a person's overall rehabilitation and HRQoL (Heyne & Andreson, 2012). Identifying internal strengths of an individual can lead to positive outcomes related to psychological, emotional, cognitive, physical, social, and spiritual well-being, while realizing external strengths can contribute to positive social and community support. Using the HRQoL concept as a guiding framework for this study will help to keep focus on promoting QoL, more so than just aspects of physical and mental health in veterans with PTSD and SUD.

Recreational Therapy within a Transdisciplinary Research Approach

The research and recommendations used in this dissertation will be guided by a transdisciplinary research approach (TDR). TDR is based on a collaboration to conduct social research that relies on the integration of knowledge of different disciplines (Leavy, 2011). Leavy (2011) states several principals for transdisciplinarity: issue- or problem-

centered, holistic or synergist research approach, transcendence (transcending disciplinary perspectives), emergence of new conceptual and methodological frameworks, innovation, and flexibility (openness to new ideas and new insights). These principals align with the goals of RT interventions, drawing from a multitude of sources and focusing on a holistic approach to serving individuals. Transdisciplinary teams have been coined as the "cornerstone" of client care, specifically in healthcare settings. In recent times, there has been a shift towards the collaboration of interdisciplinary teams due to the realization that individuals seeking care have a wide array of complexities, and no one discipline is seen to have all the answers on how to best serve and care for these individuals (Austin, 2018). As therapists utilizing a transdisciplinary approach to care for veterans, we are freed from limits of one sole intervention, and can look to the use of many treatment options to provide the best care.

Recreational therapy provides activity-based interventions to individuals with a multitude of illnesses, injuries, conditions and other issues in order to restore, remediate, and/or rehabilitate functional capabilities for individuals. It is designed to enhance psychological, physical, spiritual, and social well-being (ATRA, 2018). In doing so, providing these treatments requires cooperation and collaboration spanning the boundaries of multiple disciplines. In many instances, working within a transdisciplinary team helps to provide optimal health and well-being for everyone.

RT is known for its utilization of interventions, approaches, and techniques from a variety of sources (Austin, 2018). Its eclecticism lends to the idea that with the individuality of each person being served, the therapeutic approach can vary based on each persons' needs,

wants, and personal goals. As the client develops and moves toward a more specific goal, interventions can be tailored and adjusted based on need. Drawn from a diverse range of therapeutic sources and health service professionals, such as psychologists, social workers, psychiatric nurses, and counselors, interventions can cover multiple areas of focus and help to enhance the overall QoL of everyone.

It is important to note how the use of RT interventions may best be utilized to complement and enhance the treatment of other disciplines, such as physical therapists, occupational therapists, speech and language therapists, social workers, psychologists and psychiatrists, case managers, rehabilitation nurses and technicians. As stated, RT interventions have been growing in CIH treatment options in both clinical and community care, and research will continue to help determine which types of interventions will best serve specific populations.

In utilizing a team approach, veterans may come to better understand as aspects of their condition, and how the intersectionality of each part of the rehabilitation process can provide the most effective interventions for recovery and optimal well-being. RT is a person-centered approach, focusing on the short and long-term goals of the individual. Using these personal goals that encompass the individuals' current mental and physical health, social and emotional needs, as well as their leisure style, along with the recommendations of the transdisciplinary team, will help to provide the individual with a holistic way to shift from services based healthcare to outcome-oriented health care. Although many of the goals of RT will align with the goals of the other disciplines, it is the use of unique recreation modalities and designed intervention strategies that will set these goals apart. When discussing

traditional intervention techniques with veterans, research has shown that many veterans do not seek care for a variety of reasons, stemming from fear of stigma to a lack in help seeking behaviors (Gelkoph et al., 2013).

Due to the demand of veterans seeking care outside of the typical hospital-based setting, many recreation-based organizations have sought the assistance of scholars in different areas in order to provide optimal opportunities for veterans. These programs are typically designed to help veterans adjust to community life, cope with illness, injury or disability, and control symptoms of mental health conditions (Hawkins et al., Townsend, & Garst, 2016). RT helps to provide these veterans with a strengths-based approach to focus on the individuals strengths and existing skillset. Whereas typical hospital settings have traditionally focused on a medical model of care, focusing on a deficits approach, these interventions are now moving towards a more person-centered approach thanks to the inclusion of RT in their treatment plans. Finding the best modes of interventions for veterans with mental health issues and answering complex questions about the most effective treatment options requires a transdisciplinary approach that relies on the knowledge and expertise of individuals from diverse fields.

Dissertation Outline

This dissertation is aimed to examine the relationships between various factors of participation in RT physical activities and how they affect psychosocial areas of veterans with mental health issues. The rest of the study is presented as follows: chapter 2 provides a review of past and current literature that helps to support the idea that there is an increased need for complementary and integrative treatment options for veterans who are experiencing

mental health issues. It is an exploration around existing research that crosses disciplines of care providers, and where there may be a gap to fill. Chapter 3 describes, in detail, the research design chosen, the research questions to be answered, methodology, data collection and instrumentation, and statistical analysis. Chapter 4 is a review of the results and findings from analysis in response to the three research questions asked. Chapter 5 is a discussion and further exploration of the results and what this may mean for future studies. Limitations, suggestions for future research, recommendations for policy, practice, and future transdisciplinary research, and implications for RT are also discussed within this frame. This chapter concludes with the overall significance and summary of the findings of this research study.

CHAPTER II

LITERATURE REVIEW

The purpose of this correlational study was to examine the relationships between various factors of participation in RT physical activities, such as activity type, frequency, duration, and intensity, and three psychosocial measures for veterans at an increased risk of PTSD and SUD: depression, anxiety, and HRQoL.

Mental Health Disorders

Mental health disorders account for a large social and economic burden worldwide (Zschucke et al., 2013). However, recovery and wellness is possible if effective treatments are utilized to address the condition contributing to a person's low QoL. According to SAMHSA's National Consensus Statement on Mental Health Recovery (2008),

Mental health recovery is a journey of healing and transformation enabling a person with a mental health problem to live a meaningful life in a community of his or her choice while striving to achieve his or her full potential (Background section, insert 1).

Mental health conditions are not linked to one specific event but have been suggested to be the result of multiple, linking causes (CDC, 2018). Extended exposure to adverse social conditions, genetics, internal and external factors such as environment and stressors, as well as traumatic life events have been linked to detrimental physical and mental health effects, such as PTSD, depressive or anxiety disorders, or addiction disorders (Fisher & Baum, 2010).

Posttraumatic Stress Disorder

According to the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5; American Psychiatric Association [APA], 2013), PTSD is viewed as a trauma- and stressor-related disorder that may stem from mentally disturbing experiences related to exposure to one or more traumatic events which can include: combat, sexual or physical abuse, terrorist attack, natural disasters, serious accidents or assaults. There is significant distress or impairment in everyday life, through social interactions, capacity to work, or other areas of functioning. There are eight clusters of criteria that must be met to diagnose PTSD, A-H. In order to be formally diagnosed with PTSD according to the DSM-5, an individual needs to meet the following: criterion A, one (or more) symptoms from criterion B and C, two (or more) symptoms from criterion D and E, and criteria F-H. The defining behaviors of PTSD criterion according to the DSM-5 (APA, 2013) are summarized in Table 2.

Table 2

DSM-5 Criteria for PTSD

Diagnostic Criteria:	Examples
Criterion A: Exposure to traumatic stressor, either as victim, perpetrator, or witness (one required)	Death, threatened death, actual or threatened serious injury, actual or threatened sexual violence
Criterion B: Re-experiencing symptoms (one required)	Recurrent, involuntary, and intrusive memories, flashbacks, traumatic nightmares, intense or prolonged distress or marked physiologic activity, after exposure to reminders of traumatic event(s)
Criterion C: Avoidance Behaviours	Persistent effortful avoidance of distressing trauma-related stimuli after the event
Criterion D: Cognitive Distortions (two required)	Inability to recall key features of the traumatic event, persistent (and often distorted) negative beliefs and expectations about oneself, the world (e.g., "I am bad," "The world is completely dangerous"), Persistent distorted blame of self or others for causing the traumatic event, persistent inability to experience positive emotions
Criterion E: Increased Arousal (two required)	Irritable or aggressive behavior, self-destructive or reckless behavior, hypervigilance, exaggerated startle response, concentration problems, sleep disturbance
Criterion F: Duration	Persistence of symptoms (in Criteria B, C, D, and E) for more than one month
Criterion G: Functional Impairment	Significant symptom-related distress or functional impairment (e.g., social, occupational)
Criterion H: Exclusion	Disturbance is not due to medication, substance use, or other illness

PTSD has become one of the most prevalent mental health diagnoses for individuals in the United States, many of them experienced exposure to war and combat (Golub, Vazan, Bennett, & Liberty, 2013). Nearly 1 million veterans, who served in Iraq and Afghanistan

between October 1, 2001 and September 30, 2013, have been affected by PTSD (SAMSA, 2017). The effects of PTSD among veterans can have adverse consequences on their physical and mental health, interfering with their ability to attain the highest standard of HRQoL. Individuals diagnosed with PTSD are 80% more likely to meet diagnostic criteria for at least one other mental health disorder than those without PTSD, such as depressive, bipolar, anxiety, or SUDs (APA, 2013). VA research has found that certain factors contribute to an increase in the likelihood of the development of PTSD and other health issues in returning service members of conflicts such as: longer and multiple deployments, more severe combat exposure, severe physical or traumatic brain injury, poor social support, marital or family problems, female gender, and prior trauma exposure (USDVA, 2018). Treating these combat-related issues is a public health priority. Research on PTSD has had a great deal of attention, dating back to returning Vietnam Veterans who were attempting to get back to a "normal" lifestyle with their friends and families (USDVA, 2016).

Substance Use Disorders

In addition to PTSD, SUDs are one of the most common and major public health challenges individuals face (Lan et al., 2016). According to the DSM-5, substance-related and addictive disorders are defined as usage of drugs and/or alcohol that results in distress and/or impairment, with two or more symptoms that occur over a 12-month period. These symptoms can include: (a) unsuccessful attempts or persistent desire to reduce use; (b) a strong craving for the substance; (c) continued use despite recurrent social or interpersonal consequence; (d) substance use in situations in which it may be physically hazardous; and (e) withdrawal from the substance, etc.

These disorders encompass ten separate classes of drugs: alcohol; caffeine; cannabis; hallucinogens; inhalants; opioids; sedatives, hypnotics, and anxiolytics; stimulants; tobacco; and other (or unknown) substances. When an individual continues to use a substance, despite significant problems, such as health problems, disability, and failure to meet major responsibilities at work, school, or home, it becomes diagnosed as a disorder. SUDs are defined in a broad level of severity, from mild, moderate, to severe, based on the number of symptom criteria met by the individual. The DSM-5 uses evidence of a pathological pattern of behaviors to make a diagnosis, based on impaired control, social impairment, risky use, and pharmacological criteria.

Overuse of harmful substances can lead to not only serious physical, psychological, and social problems, but also death (USDVA, 2018). SUDs are common among the veteran population as they are an easy and accessible way to cope with the stressors of military life (Townsend et al., 2015). Due to the unique experiences and stressors veterans face, many of them are at an increased risk for substance misuse, including alcohol, drugs, tobacco, or a combination. Previous research found that cigarette and alcohol use was more prevalent among veterans than their civilian counterparts (Olenick et al., 2015).

While alcohol consumption, cocaine, heroin, and marijuana have been the most common substances misused among the military population, prescription drug abuse has soared in the past two decades and drug overdoses are now the leading cause of injury deaths in the United States (Teeters, Lancaster, Brown, & Back, 2017).Until recent changes, veterans with chronic pain and mental health issues were most commonly being treated exclusively with opioid painkillers, leading to a sharp increase in addictions and fatal

overdoses (USDVA, 2014). Additionally, those with PTSD, depressive disorders, SUDs, and other mental health issues were at an increased risk of addiction and overdose compared to the general population.

Many service members return from war or combat zones with chronic or debilitating injuries or illnesses, which require the use of medication, most commonly opioid prescription pain relievers and benzodiazepines. These issues, mixed with the difficulty of adjustment back to normal life, has posed problematic, and has led many veterans to misuse harmful substances, specifically their prescription medications, leading to addiction. These issues greatly increase the risk and complicate medical and psychiatric treatment (Goodrich & Hall, 2018).

Veterans from the most recent conflicts, i.e. OIF and OEF, have been associated with higher rates of SUDs (Lan et al., 2016). A 2012 study conducted by Seal et al., found that veterans with a diagnosis of a PTSD-associated mental illness were more likely to be prescribed opioid prescriptions, and linked these medications to adverse clinical outcomes, such as increased depressive symptoms and overdose. More than one in four military deaths is related to substance misuse each year (Teeters et al., 2017). Additionally, veterans with co-occurring mental health issues who received prescription opioids were at an increased risk for long-term use, early refills, and higher-dosage regimens (Seal, Shi, & Cohen, 2012).

Co-morbidities among PTSD and SUDs

Often, PTSD and SUD co-exist together, in both civilian and military populations (Hamblen & Kivlahan, 2016). Hamblen and Kivlahan (2016) reviewed one national epidemiological study and found that 46.6% of individuals with lifetime PTSD also met

criteria for SUD. Research has shown that in most cases, PTSD precedes the onset of SUD, as individuals are likely attempting to self-medicate and alleviate distressing symptoms. In a study conducted by Teeters et al. (2017), veterans diagnosed with PTSD or another mental health disorder (17.8% and 11.7% respectively) were more likely to be treated with an opioid prescription than those without a mental health diagnosis. Due to the high prevalence of receiving opioid prescriptions, those veterans diagnosed with a mental health issue were more likely to develop a SUD and experience a higher number of negative health outcomes (Teeters et al., 2017). Additionally, Seal et al. (2012) surveyed 456,502 veterans and found 9% had an alcohol-use disorder, 4.5% had a drug-abuse disorder, and 11% had another SUD. Those diagnosed also had at least one comorbid mental-health diagnosis of PTSD, depression, anxiety, adjustment disorder, or a combination (Seal et al., 2012).

More than two out of ten veterans have reported symptoms of both PTSD and SUD, and almost one out of every three seeking treatment for substance use issues also have a diagnosis of PTSD (USDVA, 2018). In lieu of more positive coping strategies to deal with exposure to stressful situations and other traumas, the relationship between PTSD and substance use has been linked to motives, specifically "drinking to cope". The motives to drink, (i.e., "coping" motives to help reduce negative emotions or deal with problems versus "social" or "conformity" motives related to celebrating with friends or fitting in) differ greatly, where the former has been directly linked to alcohol addiction in individuals (Miller, Pedersen, & Marshall, 2017).

In addition to the symptoms that occur with PTSD and SUD, veterans who have a dual diagnosis are also more likely to show increased signs of other problems in the areas of

health, familial and social relationships with peers, and/or daily functioning. Research has also shown that there have been increased problems in self-care and independent functioning, and in education or in workforce environments (USDVA, 2018). While the use of substances may cause short-term relief of symptoms, many individuals suffer the long-term consequences of addiction. For example, there is an increased risk of contracting chronic and blood borne illnesses, mental illness relapses, malnutrition, housing instability and decreases in sleep quality (SAMHSA, 2008). Additionally, mental health issues, such as anxiety and depression, are commonly comorbid symptoms with PTSD and SUD, and people diagnosed often report more negative health perceptions and HRQoL than those without comorbidity (Rauch et al., 2010).

Anxiety & Depression

Anxiety and depression are often causes of morbidity and mortality among both civilian and military populations worldwide (USDVA, 2016; Pedersen & Saltin, 2015). Additionally, individuals with PTSD and SUDs are often at a higher risk for elevated levels of anxiety and depression than other clinical populations (Tull, Lee, Geers, & Gratz, 2018).

Anxiety Disorders

Anxiety disorders are one of the most common mental health problems globally, where approximately 5% of the adult population currently suffers from some form of this disorder. They differ from the normal response to stress, and involve excessive feelings of nervousness or fear, causing problems in job performance, school, work, and personal relationships (APA, 2013).

Common types of anxiety disorders include generalize anxiety disorder, panic disorder, phobias, agoraphobia, social anxiety disorder and separation anxiety disorder. While each form of anxiety has its own unique characteristics and symptoms, most commonly individuals are affected by a physical reaction and an overwhelming feeling of fear, worry, and stress (APA, 2013).

Anxiety disorders are ranked the third most common mental health conditions (4.8%) among the veteran population (Goodrich & Hall, 2018). In general, those who have some form of an anxiety disorder are often overwhelmed with anticipation of future events and try to avoid these situations that trigger or worsen symptoms (Pedersen & Saltin, 2015). These stressors and fears continuously negatively affect veterans and their total HRQoL. As such, it is important to research the effects of the symptoms of these mental health issues on veterans, and what types of interventions can best serve to alleviate the negative consequences they may have on mental and physical health.

Depression

Depression is a mood disorder that causes distressing symptoms, affecting the way people think, feel, and handle everyday situations, such as eating, sleeping, or working (National Institute of Mental Health [NIMH], 2018). A diagnosis of depression requires symptoms to be present for at least two weeks. Signs and symptoms include, but are not limited to: (a) a persistent sad, anxious, or "empty" mood; (b) feelings of hopelessness, guilt, worthlessness, or helplessness; (c) decrease in energy, concentration, and motivation; (d) difficulties in decision making and sleeping; loss of appetite; (e) weight changes; thoughts of death or suicide or suicide attempts; and (f) physical symptoms such as aches and pains,

cramps, or digestive problems (NIMH 2018). There are different forms of depression, most commonly major depression, persistent depressive disorder, perinatal depression, seasonal affective disorder, and psychotic disorder. Depression is very common in those who have PTSD (USDVA, 2016). It typically follows a trauma, which often occurs in veterans returning from combat. They may experience feelings of guilt or regret or have painful memories and feelings about their involvement. While depression and anxiety disorders are different, individuals with depression may experience similar symptoms to those of an anxiety disorder (NIMH, 2018).

Traditional Mental Health Interventions

Previously, many treatment programs followed a *sequential* model, which first addressed the substance problem alone. Once the individual could meet a minimum length of abstinence (approximately three to six months), the next phase of treatment aimed at addressing symptoms of PTSD (Back et al., 2014). More recently, practitioners and clinicians realized lack of success of this modality in many patients, mainly due to the realization that it is difficult for an individual to maintain abstinent from substances in the face of untreated PTSD symptoms. As a result, *integrated* treatments have been implemented as the standard of care in many practices, which addresses the needs of SUDs and PTSD concurrently. Current research has shown significant improvements in symptomology of both PTSD and SUD using this type of model (Back et al., 2014).

The VA is the largest mental health provider of veterans and provides treatments for over one million patients. It offers clinically based treatments typically used as a front-line approach for treating PTSD and SUD in the form of different types of psychotherapy and

medications (USDVA, 2017). National initiatives to examine evidence-based psychotherapies have been implemented to promote effective treatment options for conditions such as depression, PTSD, insomnia, chronic pain, SUDs, and serious mental illness (Murphy et al., n.d.). Specific to PTSD, trauma-focused psychotherapies such as prolonged exposure (PE), cognitive processing therapy (CPT), and eye movement and desensitization and reprocessing (EMDR) therapy are the most well-established interventions used. When a treatment is "trauma-focused," it concentrates on the memory of the traumatic event or what it has come to mean to the individual. PE, CPT, and EMDR, are most used in the VA system, as they have been clinically supported in numerous trials in veteran patients with complex diagnoses and comorbidities (USDVA, 2017). Additionally, SIT training approaches are used to inoculate against heightened stress responses that are central to the maintenance of PTSD symptoms in the veteran (Strauss et al., 2011). Exposure therapy mainly focuses on anxiety, avoidance, and fear reduction in an individual, missing out on other main symptoms of PTSD and SUD such as skill and relationship problems (Gelkopf, Hasson-Ohayon, Bikman, & Kravitz, 2013). Furthermore, dropout rates of individuals seeking CBT appear to be significantly high, especially in those with high levels of avoidance, depression, and alcohol use. While these two interventions have been known to reduce symptomology in some individuals, research has indicated that there is a need for an additional source of treatment for those who are not ready to seek clinical care (Gelkopf et al., 2013).

Pharmacotherapy treatment is another first-line intervention strategy typically taken to address mental health needs of veterans (USDVA, 2017). Anti-depressant medications,

such as SSRIs and SNRIs, have shown to be most helpful in treating the symptoms associated with PTSD. Whether the individual chooses to only take medication or in conjunction with therapy is his or her choice, however, therapy is the key aspect to treating the underlying cause of the symptoms of PTSD. If medication were the only option sought, he or she would need to keep taking it long-term for it to continue to be effective (USDVA, 2017).

Limitations of Traditional Mental Health Interventions

While there is a large amount of empirical research to support the efficacy of these treatment options, there are limitations and barriers to each of these approaches. For example, there has been some concern with long-term effects of medication use, and while pharmacological options generally require less contact with mental health providers, current research indicates that at least 27% of veterans prematurely discontinue use of medication due to treatment failure or adverse side effects (Strauss et al., 2011). Additionally, while research has shown that treating both PTSD and SUD concurrently will provide the most effective results in decreasing symptomology, often there is a high dropout rate from these treatments, especially before benefits can be seen (USDVA, 2018). Szafranski et al. (2017), reported that in a recent meta-analysis of treatments, there was a 36% average dropout rate in trauma-focused PTSD treatments, a 30-40% dropout rate in SUD treatments, and as high as 61% dropout rates in those seeking treatments for comorbid PTSD and SUD. High rates of dropout from treatments tend to lead to reports of less symptom reduction and increased needs of future services for both PTSD and SUD.

There have been notable reasons to these dropout rates, including negative perceptions of mental health care, a lack of trust in medical providers, stigma, and other barriers to care (USDVA, 2018). Some trauma-focused psychotherapies may provoke emotional responses, and veterans may have difficulty managing these reactions, or may decide to not engage in treatments that can cause emotional (albeit short-term) discomfort (Strauss et al., 2011). Also, as psychotherapies are typically delivered in traditional medical and clinical settings, this may present as a barrier to some seeking treatment.

Approximately 40-60% of veterans who need or could benefit from mental health services do not seek assistance for their issues due to concerns about these and other barriers (Sharp et al., 2015). While lack of veteran engagement in mental health services are commonly attributed to issues of access, cost, knowledge, social support, and beliefs, one of the most frequently reported barriers to seeking care are concerns about stigma. Often veterans feel that they would be seen as 'weak' or may be treated differently by their peers if receiving services (Sharp et al., 2015).

Stigma in the military context refers to the marked identity that is outside of what is normal or acceptable and where a service member perceives or internalizes this brand about him or herself or persons with mental health disorders (Acosta et al., 2014). Military organizations have been known to stigmatize certain beliefs in relation to seeking help for mental health issues that may affect one's daily life. Military members' perceptions of how they will be treated or thought of by peers or leaders, be they correct or not, hold high influence that may dissuade them from seeking care and assistance. These beliefs and

attitudes lead many individuals to feel a sense of isolation and extreme self-reliance, posing barriers to seeking essential medical health interventions (Acosta et al., 2014).

This lack of help-seeking behavior due to the stigmatization of traditional treatment programs and other known barriers suggests the need for CIH intervention approaches that are not associated with clinical settings for veterans with PTSD and SUD. RT physical activity opportunities, such as exercise and outdoor RT interventions, can provide a unique opportunity to circumvent barriers to help-seeking behaviors. Individuals can participate in these types of interventions in nonclinical settings, are familiar with the military population, and can be done at one's convenience, often at little cost (Hawkins et al., 2016).

In a study conducted by Misra-Hebert et al. (2015), 17 veterans participated in focus groups, which discussed life priorities, motivations to improve health, and perceptions of health care. Results indicated that there was a strong individual belief concerning social exclusion and stigma, which made them hesitant in seeking health care for any conditions which may lead to exclusion. Furthering isolation from seeking or receiving health care was the emphasis of military culture on self-reliance. Veterans referred that in the military, they are trained to be independent, strong, and combat ready. When they return home, they shy away from getting help, even if health and emotional needs are not being met (Misra-Hebert et al., 2015).

Participation in physical activities is speculated to produce similar results of both antidepressant medications and some mechanisms of clinical interventions through enhancement of serotonergic neurotransmission and stimulating neurogenesis and enhancing perceived coping ability and self-appraisals, respectively (Ekkekakis, 2015). In a meta-

analysis conducted by Ekkekakis (2015), he examined the effects of exercise on depression and found that there was a large effect (i.e. standardized mean difference = -0.09) on depression, which is typically larger than what is expected from medication interventions alone. Mental health providers who support and advocate for the incorporation of physical activity opportunities in treatment programs could potentially help to support higher rates of improvement in physical, psychological, and social outcomes. In addition, approaches should be chosen based on client preference, severity of symptoms, co-existing conditions, clinician expertise and other clinical factors. Promoting resilience and positive mental and physical health interventions are key aspects in alleviating the negative symptoms associated with PTSD and its effects. Appropriate interventions ensure both mental and physical health remains an important focus to ensure all individuals lead overall healthier lifestyles (Fisher & Baum, 2010). Augmenting adjunct and alternative integrative approaches, such as RT interventions, are a high priority and may present an opportunity to meet veterans where they are to help reduce their negative perceptions of seeking help.

Recreational Therapy

Recreational therapy is an evidence-based approach to rehabilitation and treatment that helps to improve functioning among individuals based on the philosophical paradigms of leisure, health, inclusion, and practice (ATRA, n.d., p.1). These foundations are what drive positive change for a high HRQoL, focusing on a strengths-based approach to produce innumerable benefits to an individual. While RT focuses on internal strengths of an individual and his or her specific goals and needs, it also aims to include external strengths of social supports of family, community, and lifestyle to assist in improving HRQoL (Heyne &

Anderson, 2012). While the role of RT is abundant in the literature for a variety of children, youth, and adult populations, such as those with mental illness, physical disabilities, addiction, and those who have been incarcerated, there is a gap related to veterans at an increased risk of PTSD and SUD in the existing literature (Donaldson, 2016).

RT has been utilized in addition to the traditional methods of interventions in clinical settings to provide veterans with other resources to address their mental health and physical needs. Providers have begun to suggest these types of alternative programs or use in conjunction with clinical treatments to offer more choices to veterans to enhance help-seeking behaviors (Donaldson, 2016). The research that is available identifies RT as an effective source of treatment for veterans who may be ill, injured, or wounded using a variety of methodologies (Donaldson, 2016).

In the VA system, RT provides direct-care services using a veteran-centered approach, focusing on wellness and prevention, QoL, evidence-based treatment, lifestyle and community transition, and education (USDVA, 2018). Interventions most commonly include fitness and physical activity opportunities, high adventure and water sports, team building initiatives, experiential tasks, creative arts, animal assisted therapy, horticulture, and mind-body programs (Cavanaugh, 2016). These interventions have provided individuals with skills and resources needed to improve their total HRQoL. Research has supported several significant positive health benefits of using RT in the delivery of health care services, specifically for veterans (Heyne & Anderson, 2012).

RT Physical Activities as Complementary and Integrative Health Interventions

According to Guttmann (1976), there are three main overarching benefits to sport and leisure for veterans, including physical, psychological, and social benefits. Physical benefits of participating in activities include decreases in experience of chronic pain and complications and improved physical functioning and strength. Beyond the physical realm, notable increases in overall QoL, positive affect, and psychological health have been reported through engagement in these types of opportunities (Brittain & Green, 2012; Burke & Utley, 2013; Caddick & Smith, 2014). In addition, they have helped veterans to reconnect with their communities and build healthy social support systems, which is crucial when trying to develop a new, sober lifestyle.

PTSD and RT

RT has proven to be an effective treatment option in those who suffer from PTSD, specifically the veteran population (Colman, 2015). It is linked to enhancing the physical, mental, social, and emotional health factors related to PTSD and the negative symptoms that go along with it. RT can be a useful intervention to help lower the negative emotions and stress levels, while also helping to create a sense of engagement, cohesion, and belonging in those who feel isolated from their communities and loved ones. Research has supported the use of RT services that strengthen resilience and contribute to positive physical and mental health of veterans, specifically through physical training, high-intensity programming, functional fitness, and supportive wellness programming (Colman, 2015; Caddick & Smith, 2014).

Using a strengths-based approach, RT focuses on how participation in different types of physical activities impacts veterans' well-being. In several studies, their total HRQoL and mental and physical health was seen to improve in several ways. For example, in a study conducted by Dustin, Bricker, Arave and Wall (2011), results indicated that participation in a four day 'river running' (kayaking) trip led to reductions in hyper-arousal symptoms, reliving of nightmares, and relief from usual daily numbing in ten veterans with PTSD. In another study conducted by Otter and Currie (2004), veterans who participated in a 40-week exercise program experienced more feelings of control, less dependency on medication, and an increase in energy levels to counter-balance depressive symptoms associated with PTSD.

Focusing on the strengths and capabilities of individuals with PTSD through RT can help to provide them with the ability to see and understand the impact physical activity interventions can have on their mental and physical health (Heyne & Anderson, 2012). Studies have shown that participation in these types of opportunities have helped to have positive effects on different domains on one's life; specifically, in the areas of determination, strength, self-concept, sense of achievement. For example, Burke and Utley (2013) examined the influence of a nine-day climbing challenge on Mt. Kilimanjaro on four veterans with injuries. Results indicated that the veterans experienced an increase in self-determination and inner strength when faced with a goal to strive for, possibly due to the relevant features of the climb to previous military experience. Similarly, Hawkins' et al. (2011) study on veterans in an adapted Paralympic sport camp also saw an increase in commitment, determination, and self-worth by the end of the program. These examples show support that RT based

programming can provide notable positive effects on a variety of internal and external strengths, as well as on symptoms of physical and mental health issues.

SUD and RT

RT has also shown to be an effective modality in the treatment of individuals with SUDs in the last few decades (Snead, Pakstis, Evans, & Nelson, 2015). When an individual is affected by a SUD, often their engagement in pleasurable and recreational activities is greatly impacted. Common RT interventions used in the treatment with individuals experiencing SUDs are the use of leisure education, community reintegration outings, physical fitness opportunities and experiential initiatives designed to increase self-efficacy, self-awareness, self-confidence, empowerment, and motivation (Cavanaugh, 2016).

Individuals who are directly dealing with a SUD are often unaware of the value of RT, as they are more focused on the act of self-medicating rather than the benefits of a healthy lifestyle. However, results from a study conducted by Rash, Alessi, & Petry (2017) saw that individuals with a SUD who were seeking housing that required abstinence from substance use were more successful in long-term sobriety when supported recreational activities were available. This supports the idea that participating in RT while engaging in addiction treatment has shown to have a strong correlation with continued abstinence from drug and alcohol use, while also reducing the risk of relapse.

More specifically, physical activity opportunities may be one of the most effective forms of RT to those dealing with SUDs and dealing with stress, as “physical exercise may be conceived to be nature’s tranquilizer” (Austin, 1991, p. 76). Results from previous studies have shown that individuals with SUDs engaging in exercise early in recovery have shown

decreased mental health symptoms and cravings and have increased social outlets and support systems (Amdahl, 2016). For example, in a meta-analysis conducted by Wang, Wang, Wang, & Li, and Zhou (2014), results of twenty-two studies indicated that participation in moderate and high physical exercise interventions can effectively increase abstinence rates, ease withdrawal symptoms, and decrease symptoms of depression and anxiety in individuals with SUDs.

However, even with the support for positive mental and physical health benefits, most treatment programs rarely incorporate dedicated time for physical activity opportunities into their schedules (Linke & Ussher, 2015). Drawing on the strengths of RT physical activity programs on the effects of recovery trajectories, physical and mental health benefits, and psychosocial variables will assist clinical providers in identifying these interventions as valuable CIH strategies.

Strengths of RT Physical Activities

RT is grounded in providing interventions that promote psychological and physical recovery, preventing secondary health conditions, and fostering well-being and community participation among individuals with physical and mental health issues (ATRA, 2018). The scope of RT is supportive of veterans with PTSD and SUD in their recovery process, addressing the specific needs of this vulnerable population. As PTSD and SUD decrease veterans' functional health and well-being levels, participation in RT physical activities can provide opportunities to address these concerns and help to increase veterans' total HRQoL and reach their highest potential.

Research has shown that the psychological and physiological symptoms associated with PTSD can be positively affected by engagement in exercise opportunities, specifically, anxiety, depression, substance use, pain, and brain function (Whitworth & Ciccolo, 2016). Whitworth & Ciccolo (2016) examined the effects of exercise on PTSD symptoms, exercise behavior, psychological distress, sleep quality, and substance use in 182 veterans. Results indicated that engaging in exercise, particularly at a strenuous intensity level, had a direct beneficial association on avoidance/numbing and hyperarousal symptoms of PTSD.

Exercise has shown to be an effective means of coping in individuals going through difficult situations or having challenging thoughts and/or emotions (Zschucke, Heinz, & Strohle, 2011). Coping skills are essential in recovery from substance use, especially in the early stages. Without successful means of coping, the risk of relapse is significantly increased, suggesting exercise as a beneficial intervention for this population. Not only does exercise increase the ability to cope through difficult situations, studies have shown that exercise could lead to a causal decrease in substance use by producing protective effects in procedures that mirror phases during the development of, and recovery of, a SUD (Smith & Lynch, 2012). Amdahl (2016) states that exercise is highly effective in reducing stress, improving mood, decreasing cravings, increasing options for alternate activities, and increasing social outlets and supports, some of the biggest challenges for those in early stages of addiction recovery.

Types of Recreational Therapy Physical Activities

As stated earlier, RT is a treatment service that aims to assist individuals restore, remediate, and rehabilitate to their highest level of independent functioning in life's activities

(ATRA, 2018). It helps to promote health and wellness and to reduce or eliminate limitations and restrictions to participation in everyday activities due to an illness or disabling condition. RT uses a wide range of modalities to address an individual's rehabilitation goals, including some form of physical activity, leisure experience, or outdoor experience.

RT plays an important role in the treatment and rehabilitation of veterans and can offer a wide variety of CIH interventions for mental health issues (Hawkins et al., 2016). Many types of physical activity interventions, such as aerobic exercises, weight training, adventure therapy (AT), and mind-body exercises incorporate strengths-based concepts that provide veterans with alternative options to treatment than traditional services in medical settings. Due to the increasing demand of veterans seeking care outside of the VA system, many recreation-based organizations have begun providing physical activity programs with these types of alternative or complementary rehabilitation options. These programs help veterans reintegrate into community life, cope with physical disabilities, form peer support networks, and control symptoms related to mental health conditions (Hawkins et al., 2016). The goal of exploring the different types of RT physical activities is to present evidence-based research for using these models, and determine which type and at what frequency, intensity, and duration will be most effective to improve symptoms of PTSD and SUD in this population. Types of RT physical activity opportunities related to this study include traditional indoor fitness, outdoor AT, and mind-body practices.

Traditional Indoor Fitness

Traditional indoor fitness will encompass aerobic and strength training exercises. Aerobic exercises (e.g., running on a treadmill, using an elliptical, using a stationary cycle,

etc.) focus on burning calories and improving cardiorespiratory function; while strength training exercises (e.g., lifting weights, working with resistance bands, body-weight exercises) focus on progressive building of muscle mass and training for the most effective way to enhance muscle strength and endurance in the specific areas of the body being trained (Landale, 2012). These types of activities have shown to release endorphins in the brain, like opiate molecules, which elicit similar effects of drug and alcohol use, making it an attractive alternative treatment to some with SUDs (Landale, 2012).

The research around exercise and fitness as effective RT intervention strategies pose a rationale that they should be offered as CIH options to veterans with PTSD and SUD. For example, in a study conducted by LeBouthillier, Fetzner, & Asmundson (2015), participants were asked to engage in six sessions of stationary cycling at moderate to vigorous intensity. Results indicated that participating in this cycling intervention alleviated both PTSD symptoms and anxiety severity in those who attended all six sessions. In a similar stationary cycling study, 217 veterans with PTSD in a residential treatment program participated in an intervention during their 60-90 day stay. Results indicated that participation in the exercise program was associated with a significant decrease in hyperarousal symptoms from intake to discharge (Babson et al., 2015). Additionally, in a study conducted by Mobily, Mobily, Lane, & Semerjian (1998), results indicated that adults who participated in an 8-week strength training program showed significant improvements in functional fitness measures over the course of the intervention. These interventions identify a need and a trend in RT to configure service delivery around health and health promotion. As mental health issues, specifically PTSD and SUD, in the veteran population continue to rise, health care providers need to

identify CIH interventions, such as RT that coincide with the nature and ideals of this population.

Outdoor Adventure Therapy

While the benefits of physical activity and fitness has been researched and identified, there is a gap in the literature to support the potential for the effects adventure-based interventions can have on an individual (Caddick, Smith, & Phoenix, 2015). AT engages individuals on the affective, behavioral, and cognitive levels, and seeks to address several psychosocial issues, most often in natural, outdoor settings (Gass, Gillis, & Russel, 2012). It combines the benefits of adventure-based experiences, with aspects of traditional therapy.

AT challenges its participants to identify and capitalize on their strengths, potentials, and perceived limitations, and process how they can translate into other aspects of their lives. AT is used as clinical tool in which individuals participate in activities to promote therapeutic changes in specific outcomes (Tucker & Norton, 2013). While these programs do not require the participants to go out on a risky expedition, it does enable them to work on skills of cooperation, problem-solving, and teamwork. Adventure-based groups can include a wide range of activities such as camping, canoeing, hiking, rock-climbing, low and high challenge course activities, problem solving initiatives, among many others. Tucker & Norton (2013) listed values inherent in adventure activities, such as promoting cooperation and trust among participants, acting as metaphors for the situations that have occurred in a participant's life, and the cooperation with the elements of nature.

Participation in AT seeks to promote positive mental health changes while using the "ABC-R triangle: emotional response (**A**ffect), acting out or withdrawn (**B**ehavior), or

irrational or problematic thoughts (**C**ognition), integrated around the systemic **R**elationship(s) of the individual and their therapist, field staff, peer group, family, and community," (Gass et al., 2012, p. 51). The relationship of these three key foundations is examined and helps the therapist identify which type of intervention will be most beneficial to the individual and meet them where they are.

A large portion of past research in AT has been based around the adolescent population, but recently there has been advancements in interventions with diverse populations (Tucker & Norton, 2013). AT has shown positive effects in increasing social skills and pro-social behaviors, decreasing recidivism in juvenile sex offenders, and decreasing depressive symptoms and substance use in adolescents. In addition, it has also been effective in decreasing negative symptoms of PTSD and increasing overall well-being and personal development in the adult population (Tucker & Norton, 2013).

Outdoor AT activities, such as kayaking, fishing, cycling, rock-climbing, etc. have promising implications as CIH intervention strategies for reducing a variety of psychological and physical symptoms of mental health issues in veterans (Vella et al., 2013). For example, in a study conducted by Lundberg, Bennett, and Smith (2011), results showed improved psychological health, improved QoL, and improved mood states for veterans with injuries following participation in outdoor adaptive sports. The veterans participated in waterskiing, kayaking, river rafting, canoeing, fly-fishing, Nordic and alpine snow skiing, snowboarding, and ice skating. Others, such as Caddick & Smith (2014), examined the benefits of outdoor activities on combat veterans with PTSD. They found that the benefits of these types of programs, in this case surfing, can play a role in improving overall well-being and QoL.

Similarly, Bennett et al., (2017) conducted a study of 40 veterans who participated in a 4-day therapeutic fly-fishing program and results indicated a significant decrease in symptoms of posttraumatic stress, depression, perceived stress and functional impairment, and an increase in leisure satisfaction.

Mind-Body Practices

There is a large body of research supporting the positive benefits of mind-body practices on the physical and mental health of individuals and the use of these interventions as CIH have grown within many care settings in the past few years (Department of Health and Human Services [USDHHS], 2017). While there is a large and diverse group of practices that can be effective, the most common and popular forms of techniques used are yoga, meditation, relaxation techniques, tai chi, and movement therapies. These types of practices have been known to help alleviate many types of debilitating illnesses, injuries, chronic pain, and other health problems through the practice of relaxation techniques and stress management.

Yoga, a union of the mind, body, and spirit, has been termed a useful intervention for that is composed of physical postures, breathing techniques, and meditation. It has been noted that it can target stress brought about by several chronic disorders, such as depression, anxiety, diabetes and insomnia. Tai chi, an ancient form of exercise that originated some 800 years ago, has been used in many different environments to improve health and well-being for many individuals (Austin, 2018). This type of movement has received increased attention from several disciplines, to include nurses, physicians, occupation therapists, physical therapists, and recreational therapists. Several research reviews have found that tai chi can

increase positive emotional, mental, and physical therapeutic outcomes, while decreasing stress levels, anxiety, and depression. There have also been clinical studies which have found that this type of intervention can improve HRQoL (Austin, 2018).

Specific to the military population, the use of mind-body practices has shown positive correlations in the support of these practices for the alleviation of psychological symptoms (USDHHS, 2017). There is a growing body of research being conducted by the NCCIH, the USDVA, and other agencies to see the level of effectiveness of these interventions as CIH to traditional treatment methods for these issues and pain management in the veteran population. In 2015, the National Advisory Council on Complementary and Integrative Health (NACCIH) developed a working group to examine the effectiveness of mind-body practices in military and veterans' health care settings. They focused on how these interventions assisted in the alleviation of chronic pain in individuals due to the high prevalence and widespread opioid use among this population.

Chronic pain often co-occurs with mental health issues such as PTSD, depression, and SUD, and both are often difficult conditions to treat. Many veterans, in turn, seek the assistance of opioid medications as a first-line treatment for these chronic issues (Toblin, Quartana, & Riviere, 2014). As a result, reliance on prescription medication rises and opioid misuse increases, leading to a high number of overdose-related hospitalizations and deaths. The prevalence of these associations revealed a need for CIH options for veterans with these conditions, and research has shown that mind-body practices can provide such approaches. While research is growing, yet still limited, RT interventions have been using mind-body approaches in a variety of ways (Reddy, Dick, Gerber, & Mitchell, 2014). As these types of

programming include treating the person in a holistic way, focusing on internal and external strengths, the use of techniques such as yoga, mindfulness, tai chi, and meditation can offer the skills needed to address symptoms of mental health issues (Fiore, Nelson, & Tosti, 2014). For example, research has shown that these types of interventions have shown significant reduction of stress and anxiety (Stoller, Greuel, Cimini, Fowler, & Koomar, 2012), and symptoms of PTSD in combat veterans (Bormann, Liu, Thorp, & Lang, 2012). Staples, Hamilton, & Uddo (2013) evaluated the feasibility and effectiveness of a yoga program as an integrative treatment for improving PTSD symptoms in twelve veterans. Results indicated that participation in twice weekly sessions for six weeks had significant positive effects on hyperarousal symptoms and quality of sleep, although no significant improvements in total PTSD, anger, or QoL outcome scores.

Additionally, Gaddy (2018) examined the effectiveness of a 4-week interdisciplinary integrative medicine program for veterans participating in the Mental Health Residential Rehabilitation Program at the Dwight D. Eisenhower Veterans Affairs Medical Center. This study looked at the use of integrative treatment options, such as meditative practices, nutrition, creative expression, tai chi, hatha yoga, sensory and breathing techniques, and lifestyle changes to enhance wellbeing. Results indicated that veteran reports of physical and mental health scores improved from before to after inclusion of these types of treatment into the core treatment of the program. These results suggest CIH opportunities can help with several health conditions and symptoms.

As such, in a time when it is difficult to reach veterans who need mental health services, it is important to find effective alternative and integrative ways to address their

issues, focusing on their internal strengths for help as drivers for change. With research growing to support its effectiveness, the use of RT mind-body approaches is moving forward as acceptable and feasible CIH strategies that aim to enhance a variety of mental and physical health outcomes in veterans, such as increased quality of sleep and life enjoyment, decreased feelings of depression, and an increase in total HRQoL (Fiore et al., 2014).

Importance of the Study

With improvements in physical safety, technology, emergency medical services, and access to immediate life-saving medical attention, survival rates of military men and women in combat zones has increased with the most recent conflicts of OIF/OEF (Townsend et al., 2015). With these advancements comes an increase in emotional, psychological, and physical health injuries and illnesses in service members. With survival rates going up, but disabilities and diagnoses also on the rise, it is essential to provide effective treatment options to this population that enhances their total HRQoL and life satisfaction. Due to complexity of the mental health issues and coexisting diagnoses of PTSD and SUD among the veteran population, and the low percentage of help-seeking behaviors, it is a major health concern to provide complementary and integrative sources of treatment.

Specifically, RT physical activity opportunities have evidence-based research to provide support for these interventions as less stigmatizing, in which more individuals, specifically veterans, are willing to seek help for their mental health issues. RT programming has been studied as a modality that helps to increase total HRQoL in the physical and mental health realms of veterans and to mitigate various symptoms related to PTSD and SUD (Hawkins et al., 2016). RT physical activity opportunities, such as traditional indoor fitness,

outdoor AT, and mind-body programs have been noted to provide strengths-based approaches in which individuals, specifically veterans, are able to reduce symptoms of PTSD, anxiety, and depression, as well as increase internal strengths, such as adjusting to community life, positively coping with life stressors, and increasing overall mental health recovery. To provide the most beneficial programming, it is important to identify which types of activities are most effective in alleviating the symptoms related to this population, and how often is needed to see results.

There have been few studies that have compared the physical and mental health outcomes of each of these specific types of activity settings. In one study conducted by Rogerson, Gladwell, Gallagher, and Barton (2015), they examined the influences of green outdoor settings versus built indoor settings on psychological and social outcomes in twenty-four participants. Participants were asked to complete two conditions of fifteen minutes of cycling in both indoor and outdoor settings. Results indicated that there were significant differences in social interaction time, intention for future exercise behavior, and directed attention in outdoor versus indoor settings, indicating a preference for outdoor environments. However, scores were not statistically significant by condition for changes in mood or perceived exertion. Similarly, in a study by Pasanen, Tyrvainen, & Korpela (2014), they examined the differences in well-being benefits of physical activity between indoor, outdoor, and built outdoor environments. Results indicated that participation in natural outdoor settings found better emotional well-being and perceived health, even when controlling for difficult life events or disabilities.

While these studies show that there can be differences in the types of settings and the impact on psychosocial health in the general population, they are not specific to vulnerable populations, such as veterans at an increased risk of PTSD and SUD. As this population has unique needs, it is important to further evaluate the effectiveness of each program and its benefits to the total HRQoL of veterans. This correlational study was designed to help identify the type of activity, as well as the frequency, intensity, and duration of these activities that have the most beneficial effects on the mental health veterans at an increased risk for PTSD and SUD. In doing so, this research will add to the existing literature in support of RT physical activities as effective interventions for mental health issues but will also help to narrow in on what factors provide the best results for this population. It will help to provide evidence-based research for RT mental health providers to offer effective, CIH treatment options to veterans with mental health issues and accompanying symptoms.

Operational Definitions

The following provides a detailed list of terms and definitions to ensure the reader has a clear understanding of the terminology and acronyms used within this research.

Adventure therapy (AT): Engages individuals on the affective, behavioral, and cognitive levels, and seeks to address several psychosocial issues, most often in natural, outdoor settings (Gass et al., 2012).

Anxiety: Different from the normal response to stress, and involve excessive feelings of nervousness or fear, causing problems in job performance, schoolwork, and personal relationships (APA, 2017).

Complementary and integrative health (CIH): Diverse medical and health care interventions, practices, products or disciplines that are not considered part of conventional medicine. It is defined as being used in conjunction with other conventional treatment approaches (complementary) and instead of conventional interventions (alternative) (NCCIH).

Depression: A mood disorder that causes distressing symptoms, affecting the way people think, feel, and handle everyday situations, such as eating, sleeping, or working (NIMH, 2018).

Health-related quality of life (HRQoL): A multi-dimensional concept examining an individual's or group's perceived physical, mental, emotional, and social functioning domains. It assesses how positive influences in one's life impacts health status and well-being, and helps to measure effects of chronic illness, treatments, and short- and long-term disabilities (ODPHP, 2018).

Physical Activity: Any movement in which the body is working its muscles and is requiring more energy than resting, such as walking, running, dancing, swimming, yoga, gardening, exercise, etc. Four main types of physical activity include aerobic, muscle-strengthening, bone-strengthening, and stretching (NIH, 2016).

Posttraumatic stress disorder (PTSD): A disorder that can occur after a person has experienced a traumatic event, such as combat, crime, accident, or natural disaster. Individuals often experience symptoms including reliving the event via intrusive memories, flashbacks and nightmares; avoiding places or things that remind them of the event or trauma; a shift to more negative thoughts and feelings, numbness, and feelings of hyperarousal (USDVA, 2016).

Recreational Therapy (RT): RT is a systematic process that utilizes recreational and other activity-based interventions to address the needs of individuals with illnesses and/or disabling conditions, as a means of psychological and physical health, recovery and well-being. Further, RT is a treatment designed to restore, remediate, and rehabilitate a person's level of functioning and independence in life activities, to promote health and wellness as well as reduce or eliminate the activity limitations and restrictions to participation in life situations caused by an illness or disabling condition (ATRA, 2018).

Stigma: A dynamic process by which a service member perceives or internalizes this brand or marked identity about himself or herself or people with mental health disorders. This process happens through an interaction between a service member and the key contexts in which the service member resides (Acosta et al., 2014).

Substance use disorder (SUD): Defined in a broad level of severity, from mild, moderate, to severe, based on the number of symptom criteria met by the individual. SUD is diagnosed when the recurrent use of alcohol and/or drugs causes clinically and functionally significant impairment, such as health problems, disability, and failure to meet major responsibilities at work, school, or home. The DSM-5 uses evidence of a pathological pattern of behaviors to make a diagnosis, based on impaired control, social impairment, risky use, and pharmacological criteria (APA, 2013).

CHAPTER III

RESEARCH DESIGN AND METHODS

The purpose of this study was to examine the relationship between various factors related to participation in RT physical activities and self-perceptions of depression, anxiety, and HRQoL for veterans at an increased risk of PTSD and SUD. This study explored the different variables related to participation in RT activities (type of activity, frequency, intensity, and duration) and how they correlated with self-perceived ratings of mental health (depression, anxiety, and HRQoL). Two instruments measured the variables related to self-perceptions: The Hospital Anxiety and Depression Scale (HADS) and the Veterans RAND 12-Item Health Survey (VR-12). The variables that measured and identified the factors related to participation in RT activities are listed below and were identified by the participant in the questionnaire.

Research Design

A cross-sectional, quantitative, correlational research design was used to understand relationships and patterns in the analysis of survey data. The use of a survey instrument allowed for generalization of a sample population so that inferences could be made about the larger population of veterans at risk for PTSD and SUD. This was the preferred type of data collection procedure for the analysis of the relationships among various factors related to participants' participation in RT activities and their self-perceptions of depression, anxiety, and HRQoL.

Research Questions

- RQ1: What are the relationships between factors of frequency and duration of participation in different types of RT physical activities (traditional indoor fitness, outdoor adventure therapy, and mind-body practices) and self-perceived ratings of mental health (depression, anxiety, and HRQoL)?
- RQ2: What is the relationship between the frequency of sessions participating in activities of various intensity levels (strenuous, moderate, or mild) and self-perceived ratings of mental health (depression, anxiety, and HRQoL)?
- RQ3: Are there significant differences in self-perceived ratings of mental health (depression, anxiety, and HRQoL) with respect to the type of RT physical activity that participants prefer to engage in the most (traditional indoor fitness, outdoor adventure therapy, and mind-body practices).

Participants

Military veterans over the age of 18 who currently had, or had in the past, exhibited symptoms of PTSD, SUDs, or other mental health issues were recruited via social media and email through the University of Massachusetts-Boston from January-March, 2020. Exclusion criteria included not having served in the military and those who did not score high enough on the symptom severity screening tools for a clinically relevant score on the PCL-M or high symptom severity of SUD symptoms. The participants included 102 veterans (86 male, 16 female; age range: 18-74 years). Participation in this study was completely voluntary and if interested, participants contacted the primary researcher via email and were sent the link to the survey. The survey was provided through Qualtrics. All data collected was anonymous

and presented to participants as a survey examining the relationship between participation in physical activity opportunities and self-reports of mental health and substance use issues. The sample was selected purposively (that data will be selected to serve a specific need) and conveniently (that participants will be selected because of convenient accessibility). Purposeful sampling was used to ensure that all participants meet the inclusion criteria.

From the participants who reported demographic information, the sample was predominately Caucasian males (78%; 84% respectively) with 12% reporting a GED or high school degree, 5% having completed some college, and 67% having completed a college degree or higher. Most of the participants (57%) were married and (59%) working as a paid employee. Most of the veterans served in either the U.S. Army or Marines (39% and 28% respectively), and a little over three-quarters (77%) had been deployed to a combat zone. Of those that had been deployed to a combat zone, 56% had been deployed two-to-three times, while 15% had been deployed four or more times. Surprisingly, only 79 participants chose to answer if they had been in the past six months or were currently in treatment for PTSD and/or SUD issues. A more detailed table of demographics can be seen in the results section (see table 3).

Informed consent was provided to the research participants electronically at the beginning of the survey, explaining a brief description and outline of the project and procedures to ensure protection of privacy. They were informed of the purpose of the study, its voluntary nature, policies and procedures, what type of data would be collected, the time commitment asked of them, potential benefits and risks, contact information, and the use of the results (Appendix A). IRB approval was approved from the University of Massachusetts

Boston on Dec 16, 2019, protocol number 2019230 (Appendix B). Each participant was offered the opportunity to speak with the researcher for any additional questions or concerns they may have. A power analysis conducted stated an aim of 64 participants would be appropriate for conducting t-tests, and an aim of 84 participants for conducting correlation tests for an 80% of power. Participants were recruited for a two-month period, from January 2020 to February 2020.

Data Collection & Instrumentation

Those participants who agreed to participate confirmed their willingness and understanding by reading and electronically checking the informed consent form before proceeding to the start of the survey. Each participant then completed a 20-minute survey consisting of a five-part questionnaire that included questions of general demographic and military history, as well as activity history and preference for each participant. Other relevant variables were assessed using the HADS, PCL-M, BAM, and VR-12 (Appendix C). Section one consisted of the demographic and activity preference questionnaire to determine gender, age, race, education level, marital status, and military service. Other collected information included deployment information (if applicable), social support system, mental health or family issues, as well as treatment and intervention history, such as prescribed medications, out/inpatient counseling for PTSD and/or substance abuse, as well as organizations or support groups such as Alcoholics Anonymous and/or Narcotics Anonymous (if the participant chose to answer). Activity history and preference questions included the following variables: (a) RT physical activity preference (traditional indoor fitness, outdoor AT, or mind-body practices); (b) frequency of participation (average number

of sessions per week); (c) duration of participation (average number of minutes per session); and (d) intensity of participation (average number of days spent participating in activities of either strenuous, moderate, or mild intensity levels). The participants for the study then completed parts two and three, the PCL-M and the BAM, respectively, to assess a baseline level of severity of PTSD and SUD symptoms. They also chose to answer part four and five of the self-administered questionnaire to assess self-perceptions of depression, anxiety, and HRQoL, the HADS and the VR-12, respectively. These instruments provided quantifiable measures for each self-rating.

Posttraumatic Stress Disorder Checklist for Military

This study used the Posttraumatic Stress Disorder Checklist for Military (PCL-M; Weathers, Litz, Henmin, & Keane, 1993) to get a baseline of severity for present PTSD symptoms. The PCL-M is a psychometrically sound self-report measure tool widely used for military service members. It is a 17-item measure based on the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* criteria that helps to assess the presence and severity of PTSD symptoms, specific to "stressful military experiences" (DSM-IV; American Psychiatric 24 Association, 1994).

This scale asks respondents to rate how often they have experienced specific symptoms in the past month based on a 5-point Likert scale, ranging from one (not at all) to five (extremely). For example, "in the past month, how often have you been bothered with repeated, disturbing dreams of a stressful military experience"? Possible scores could range from 17-85 for the total score. Higher scores (those greater than 50) indicated a higher level of severity of posttraumatic stress symptoms in military service members.

The PCL-M has demonstrated strong psychometric properties. Estimates of internal consistency (Cronbach's alpha) range between .94 (Blanchard et al, 1996) to .97 (Weathers et al. 1993). Test-retest reliability has been reported as .96 at 2-3 days and .88 at one week (Blanchard et al.,1996; Ruggiero et al.,2003).

The Brief Addiction Monitor Scale

The severity of addiction was measured by The Brief Addiction Monitor Scale (BAM; Veterans Health Administration). The BAM is a 17-item, multidimensional progress monitoring tool designed to support the provision of measurement-based care to patients commencing and matriculating through treatment for SUDs. The BAM can be administered by clinical staff as an in-person or telephone interview or can be completed as a patient self-administered questionnaire. The scores were used to screen participants for eligibility based on risk and use factors. It is noted that the BAM does not generate a psychometrically refined total score; and, it is cautioned that its three factor scores (use, risk, and protective) need additional psychometric evaluation. However, veterans and providers have found it an appropriate set of items (17 not including the drug specific items that are asked conditional on any drug use) to inform baseline symptom severity, initial treatment planning, and for ongoing measurement-based care.

The BAM has been empirically derived, and items have been selected from valid/reliable predictors of risk, relapse, and recovery. The BAM items assess: (1) risk for relapse or worsening severity of SUD, (2) protective behaviors that support recovery and resistance to relapse, and (3) use of alcohol and other substances. Sample questions include "in the past 30 days, how many days did you drink ANY alcohol; or, how many days did you

use any illegal/street drugs or abuse any prescription medications" with answers on a 5-point Likert-scale ranging from 0 to 30 days.

The Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) was used to measure participants current anxiety and depressive symptoms and score a baseline of current severity of symptoms. The HADS is used to measure anxiety and depression in clinical practice and research. HADs instrument has been a useful tool for initial diagnosis or to track progression (or resolution) of psychological symptoms, and has been validated in many languages, countries and settings (Stern, 2014). It is comprised of seven questions related to anxiety and seven questions related to depression, with an approximate two- to five-minute completion time. Items on the instrument are measured on a continuous scale, and anxiety and depression scores are scored separately for quantification. For purposes of this study, the questions will be modified by using a Likert scale whose range is (1: *very often to 4: not at all*). Sample items include: "I still enjoy the things I used to enjoy; I feel cheerful; I have lost interest in my appearance; and I get sudden feelings of panic". For both scales of anxiety and depression, scores of less than seven indicate non-cases, 8-10 indicates mild cases, 11-14 moderate cases, and 15-21 severe cases (Stern, 2014).

Bjelland, Dahl, Haug, & Neckelmann (2002) conducted a review of the results of 747 studies that used the HADs scale to identify its discriminant validity and internal consistency, how it acted as a case finder for anxiety disorders and depression, and how it compared to other scales used to rate anxiety and depression. Correlations between the two sub-scales (HADS-A and HADS-D) varied from .40 to .70, respectively (with a mean of .56).

Cronbach's alpha for HADS-A varied from.68 to.93 (mean.83) and for HADS-D from .67 to .90 (mean of .82). These analyses support that the HADs is found to have high reliability and validity for use.

The Veterans RAND 12 Item Health Survey

The Veterans RAND 12 Item Health Survey (VR-12; Iqbal et al., 1990) is one of the most used HRQoL assessments today. It is a brief, generic, multi-use, self-administered health survey that is made up of twelve items to measure HRQoL, specifically in veterans. It is developed from the Veterans RAND 36 Item Health Survey (VR-36). Due to its ability to assess an individual's physical and emotional health status, it was used in this study to assess the HRQoL scores of veterans who participated. The items correspond to eight principal health domains to include general health perception, physical functioning, role limitations dur to physical and emotional problems, bodily pain, energy-fatigue, social functioning, and mental health. Answers compile two summary components, physical and mental health scores (PCS and MCS, respectively). A sample question from the physical health score includes "the following questions are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much? (a) moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf; or (b) climbing several flights of stairs; with choice of answers of yes, limited a lot; yes, limited a little; or no, not limited at all. A sample question for the mental health score includes "how much time during the past four weeks: (a) have you felt calm and peaceful; (b) did you have a lot of energy; (c) have you felt downhearted and blue; with choice answers of all of the time; most of the time; a good bit of the time; some of the time; a little of the time; and none of the time.

Statistical Analysis

To analyze the relationship between different RT participation variables and self-perception values including anxiety and depression, as determined by the HADS, and HRQoL, as determined by the VR-12, several bivariate correlation analyses were used. Data analyses were conducted using Statistical Package for the Social Sciences (SPSS) 20 (IBM Corp., 2011).

To analyze research question one, bivariate correlation analysis was used to determine the relationship between exercise frequency as assessed by the number of sessions per week participants participated in each exercise type and anxiety, depression, and HRQoL. For each analysis, the mental health measures were correlated with traditional indoor fitness sessions, mind-body practices, and outdoor AT, as well the total between all three. Bivariate correlation analysis was also used to determine the relationship between exercise duration as assessed by the number of minutes on average that each session lasted for each exercise type and anxiety, depression, and HRQoL. For each analysis, the mental health measures were correlated with traditional indoor fitness sessions, mind-body practices, and outdoor AT, as well the total between all three.

To analyze research question two, bivariate correlation analysis was also used to determine the relationship between exercise intensity as assessed by the number of sessions on average per week participants participated in exercise of mild intensity, moderate intensity, and strenuous intensity for fifteen minutes or more and anxiety, depression, and HRQoL.

To analyze research question three, A one-way ANOVA was used to determine if there were any significant differences in the average anxiety, depression, and HRQoL scores between groups of participants who preferred traditional indoor fitness exercise, mind-body practices, or outdoor AT.

CHAPTER IV

RESULTS

The purpose of this correlational study was to examine the relationships between various factors of participation in specific types of RT physical activities, such as activity type, frequency, duration, and intensity, and three psychosocial measures for veterans at an increased risk of PTSD and SUD: depression, anxiety, and HRQoL. By examining these relationships, the intent was to shed light on participation factors that would correlate with the healthiest self-perception ratings of mental health, thereby enhancing the recovery process. The results are reported in the following sections.

Sample

Of the 183 surveys collected on Qualtrics Survey Software, 102 surveys were used. Eighty-one surveys were excluded because they did not meet the screening criteria for a clinically relevant score on the PCL-M or high symptom severity of SUD symptoms. Frequency data for demographic information is presented in Table 3.

Table 3

Demographic Information

Baseline characteristic	Veteran Participant	
	n	%
Age		
18-24	1	1
25-34	34	33
35-44	35	34
45-54	21	21
55+	11	11
Gender		
Female	16	16
Male	86	84
Marital status		
Never married	28	27
Married	58	57
Divorced	13	13
Separated	2	2
Widowed	1	1
Highest level of completed educational		
Less than high school	0	0
GED	1	1
High school graduate	6	6
College	67	66
Higher education	28	27
Ethnicity		
White	78	78
Black/African American	7	7
American Indian/Alaskan Native	0	0
Asian	2	2
Native Hawaiian/Pacific Islander	0	0
Other	13	13
Employment status		
Working (paid employee)	59	58
Working (self-employed)	3	3
Not working (retired	11	11
Not working (disabled)	22	22
Not working (other)	6	6
Prefer not to answer	1	1

Baseline characteristic	Veteran Participant	
	n	%
Branch of service		
Army	40	39
Marines	29	28
Navy	12	12
Coast Guard	2	2
Air Force	8	8
Reserves	0	0
National Guard	5	5
Multiple	6	6
# of deployments to combat zone		
0	29	28
1	0	0
2	28	27
3	30	29
4	8	8
5+	7	7
Current treatment for PTSD and/or substance use issues		
Yes	41	53
No	37	47
No response	24	
Past treatment for PTSD and/or substance use in the last 6 months		
Yes	39	49
No	40	51
No response	23	

PTSD & SUD Symptom Severity Scores

The severity of addiction was measured by the BAM to inform baseline symptom severity and was used to screen participants. It consists of three factor scores: use of alcohol or substances, risk for relapse or worsening severity of SUD, and protective behaviors that support recovery and resistance to relapse. The use score ranges from 0-12 with a higher score indicating higher usage; the risk score ranges from 0-24 with a higher score indicating

a higher risk; and the protective factor score ranges from 0-24 with a higher score indicating more protective factors that support recovery and resistance to relapse.

The PCL-M was also used to get a baseline severity for present PTSD symptoms. Possible scores range from 17-85 for a total score, and scores greater than 50 indicate a higher level of severity of symptoms. Table 4 displays the descriptive statistics for the scores for the participants who qualified for the survey. Table 5 displays the number of participants who would be considered more higher risk versus lower or average risk. The sample of this study was almost even across the two categories and the mean PCL-M score was 49, only one point below what would have been considered as more severe.

Table 4

Severity of Addiction and PTSD Symptoms

Score	M	SD	Min Score	Max Score
Substance Disorder				
BAM Use	2.83	2.66	0	11
BAM Risk	9.76	3.18	0	22
BAM Protective	10.23	4.24	0	20
PTSD				
PCL-M	49	13.58	30	85

Note: The average PCL-M score was just one point below what would be considered a higher level of severity of symptoms scores (49 as opposed to 50).

Table 5

Breakdown of Severity Level- Number of Participants

Score Category	PCL-M Score
Higher Severity	48
Lower/Average Severity	54
Total	102

Note: The number of participants with higher severity of symptoms was just slightly lower than the number of participants with lower/average severity of symptoms.

Self-Perceived Ratings

As discussed, the three psychosocial measures used for veterans at an increased risk of PTSD and SUD for this study were anxiety, depression, and HRQoL. The HADS was used to measure current anxiety and depressive symptoms. Participants were given a score between zero and 21, where scores were considered 'normal' if they were between zero and seven, 'borderline abnormal' if between eight and ten, and 'abnormal' if between 11-21.

Table 6 shows the number and percentage of participants who fell into each of the categories, as well as table 7 showing the descriptive statistics for each score. For anxiety, the number of participants was highest for 'abnormal,' followed by 'borderline abnormal,' and lastly 'normal.' For depression, the result was the opposite, with the majority of participants categorized as 'normal,' followed by 'borderline abnormal,' and lastly 'abnormal.' The average score for all participants for anxiety fell into the 'borderline abnormal' category, where the score for depression fell within 'normal.'

Table 6

Self-Perceived Ratings for Anxiety & Dep- Number & Percentage of Participants

Category	Anxiety	Depression
Normal	23 / 24%	52 / 51%
Borderline Abnormal	37 / 36%	30 / 29%
Abnormal	41 / 40%	20 / 20%

Table 7

Self-Perceived Ratings Based on HADS

Rating	M	SD
Anxiety	10.26	4.56
Depression	7.5	4.6

The VR-12 was used to measure HRQoL. Answers were summarized into two scores, a physical component score (PCS) and a mental component score (MCS). Table 8 depicts the breakdown of score ranges across the participants, as well as the descriptive statistics for the total score, MCS, and PCS. The scores on the VR-12 range from 0-50 for each MCS and PCS, with a higher score indicating higher HRQoL. On average, the PCS was slightly higher than the MCS for the sample in this study. The mean PCS for all participants was 43, while the mean MCS was 36, making the combined total average score 79.

Table 8

Self-Perceived Ratings Based on VR-12

Rating	M	SD	Min Score	Max Score
Total HRQoL Score	78.89	14.15	48	126
Mental Component Score	35.76	9.7	15	94
Physical Component Score	43.13	13.08	15	66

Physical Activity Factors

In order to evaluate the relationships between participants' self-perceived ratings and various factors of participation in specific types of RT physical activities, participants were asked a number of questions concerning their typical patterns of exercise.

Research Question 1

What are the relationships between factors of frequency and duration of participation in different types of RT physical activities (traditional indoor fitness, outdoor adventure therapy, and mind-body practices) and self-perceived ratings of mental health (depression, anxiety, and HRQoL)?

Participant Information for Average Frequency of Sessions

Participants were asked to report the average number of sessions per week they participate in various types of activity, as well as the total number of sessions. Traditional indoor fitness activity examples given to participants included weightlifting, cardio machines, running, cross-fit, and body weight exercises. Mind-body activities included examples such as yoga, tai-chi, reiki, Pilates, and tai kwon doe. Outdoor AT activity and sports examples given included hiking, water sports, snow sports, kayaking, surfing, soccer, and football. For this sample, the average number of sessions per week engaging in different activity types was one to three, for a mean total of about five sessions per week (see table 9).

Table 9

Number of Sessions per Week Engaging in Different Activities

Activity Type	M	SD	Min	Max
Traditional Indoor Fitness	2.97	2.52	0	15
Outdoor Adventure	1.49	1.57	0	7
Mind-Body Practices	1.11	1.76	0	8
Total Sessions	5.57	4.07	0	17

Results for Average Frequency of Sessions

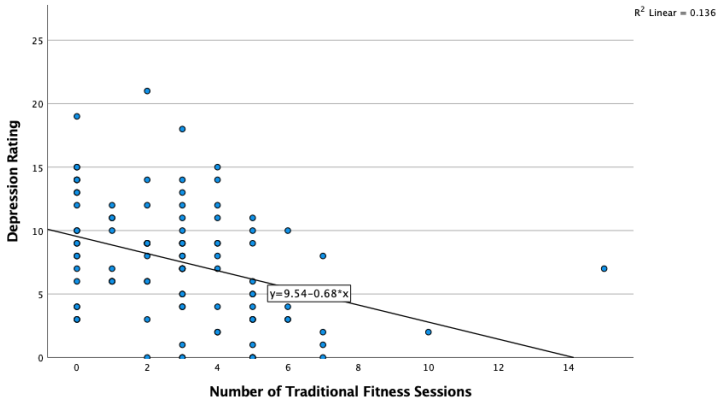
This study hypothesized that people who engaged in more activity sessions per week would have better self-perceived ratings for anxiety, depression, and HRQoL, and that the relationships would be significant. However, it was unclear if some relationships would be stronger than others based on the type of activity.

Traditional Indoor Fitness

Findings showed that a negative correlation between the number of traditional indoor fitness sessions per week and depression was significant (r = -.368; $p < .001$). As the number of sessions per week increased, the depression rating decreased, suggesting less symptoms of depression (see figure 1).

Figure 1

1. *Correlation of Depression and Number of Traditional Fitness Sessions*



Findings also showed that the number of traditional indoor fitness sessions per week was positively significantly related to physical HRQoL ($r = .339$; $p = <.001$) as well as total HRQoL (r = .42, p < .001). Engaging in more sessions per week was associated with a better

physical HRQoL score (see figure 2) and total HRQoL score. The relationship between frequency of traditional indoor fitness sessions per week and anxiety was not significant.

Figure 2

2. Correlation of Physical HRQoL and Number of Traditional Fitness Sessions

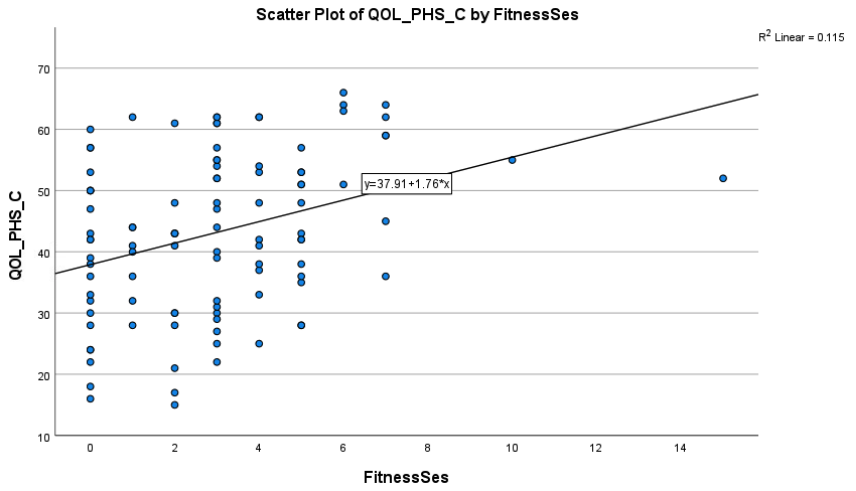
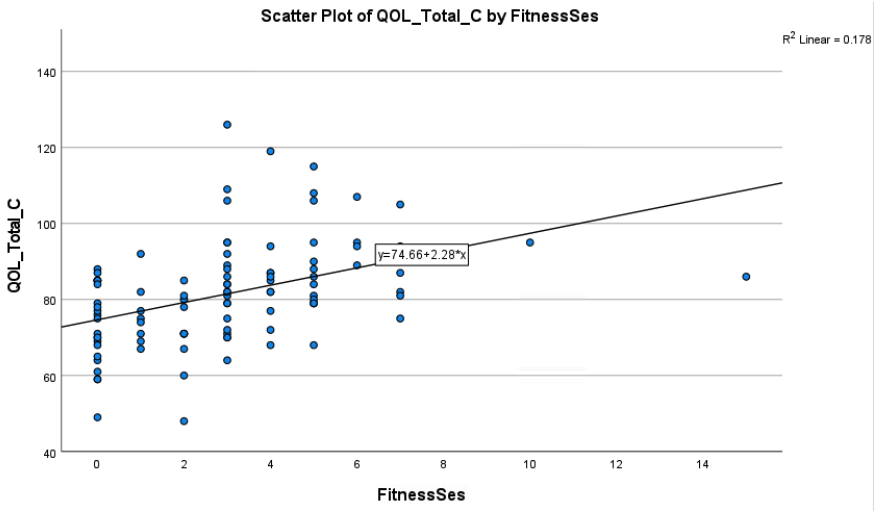


Figure 3

3. Correlation of Total HRQoL and Number of Traditional Fitness Sessions



Outdoor Adventure Therapy

This study also found a significant relationship (p = .002) between participation in outdoor AT and depression. As veterans reported participating in more outdoor AT sessions, the lower their depressive symptoms were (see figure 4). This study also found a significant relationship between participation in outdoor AT and total HRQoL (r = .194, p.= .05). The more outdoor AT sessions one participated, the higher total HRQoL scores were (see figure 5). The relationship between outdoor AT sessions and anxiety was not significant.

Figure 4

4. Correlation of Depression and Frequency of Outdoor Adventure Sessions

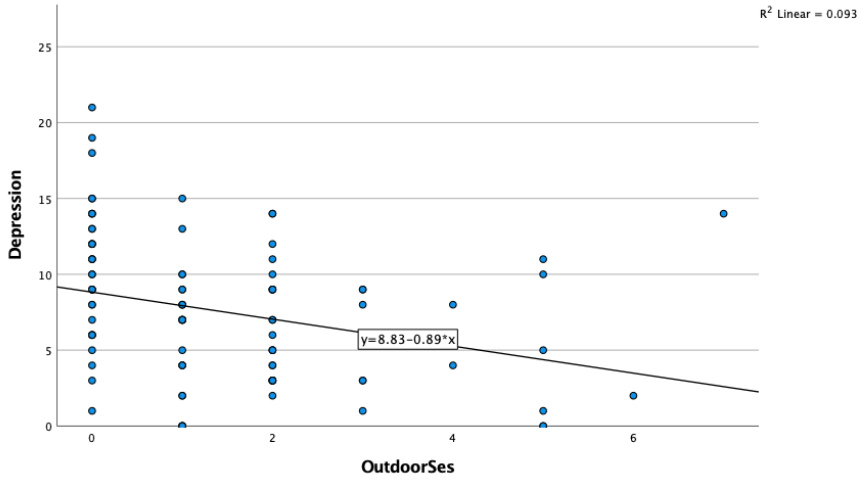
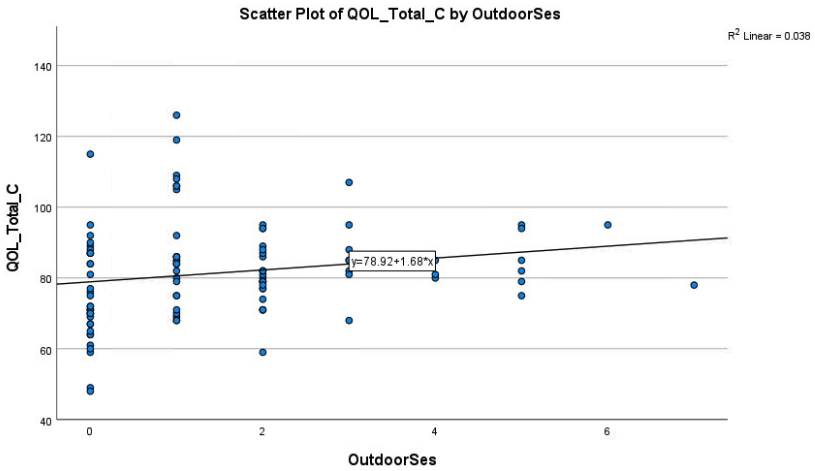


Figure 5

5. Correlation of Total HRQoL and Frequency of Outdoor Adventure Sessions



Mind-Body Practices

No significant findings were found between any of the outcome measures and mind-body practices for session frequency.

Total Sessions

When looking at the total number of sessions per week for all activity types combined, the correlation between the number of total sessions and depression was significant (r = -.325, p = .001). As the number of sessions increased, one's depression rating decreased, suggesting less symptoms of depression. Figure 6 demonstrates this relationship.

The correlation between the total number of sessions and physical HRQoL was significant (r = .27, p = .007). The correlation between the total number of sessions and total HRQoL was also significant (r = .3, p = .002). As the number of total sessions increased, both physical HRQoL and total HRQoL increased. See figure 7 for physical HRQoL and figure 8 for total HRQoL.

Table 10 gives a summary breakdown of all of the frequency relationships and which ones were significant based on a *p* value of .05.

Figure 6

6. Correlation of Total Sessions and Depression

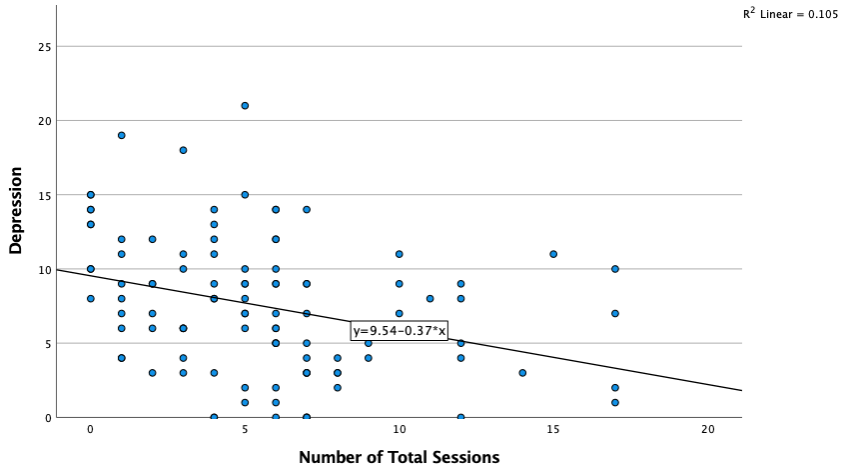


Figure 7

7. Correlation of Total Sessions and Physical Quality of Life

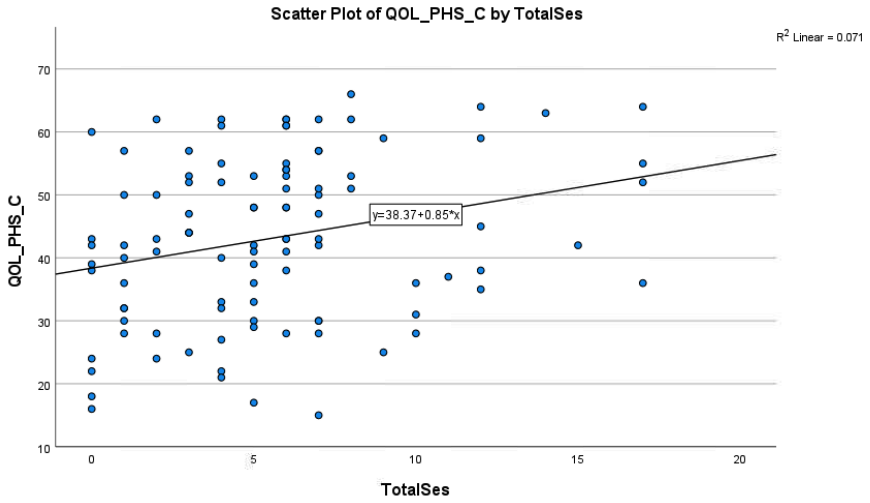


Figure 8

8. Correlation of Total Sessions and Total Quality of Life

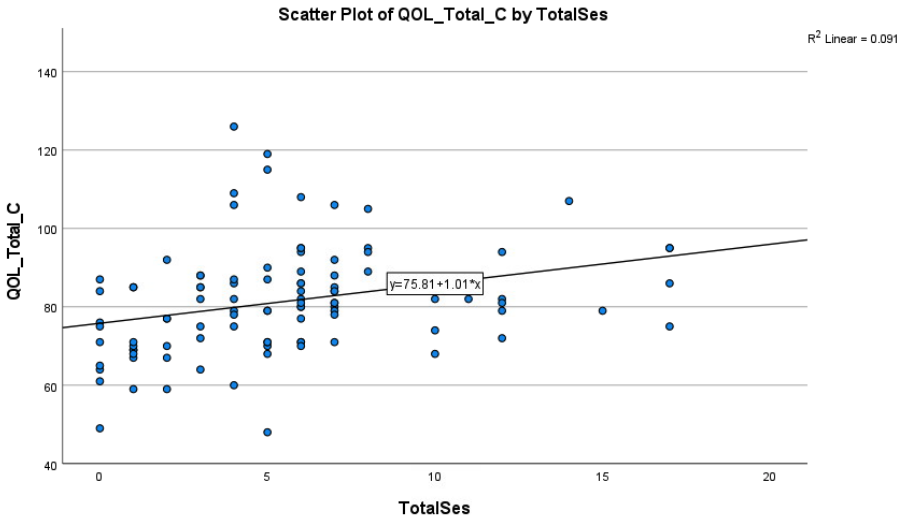


Table 10

Frequency vs. Self-Perceived Ratings Correlation p Values

Activity Type	Anxiety	Depression	Physical HRQoL	Mental HRQoL	Total HRQoL
Traditional Indoor Fitness	0.395	< .001* (*r* = -.368)	<.001* (r = .339)	.09	.<.00*1 (r= .422)
Outdoor Adventure Therapy	0.422	.002* (*r* = -.3)	.06	.889	.05* (r= .194)
Mind-Body Practices	0.415	0.7	.72	.67	43
Total Sessions	0.522	.001* (*r* = -.325)	.007 (r = .27)	.67	.002* (r = .3)

Note: The asterisk represents the relationships that were found to be significant.

Participant Information for Average Duration of Sessions

Participants were also asked to report the average duration in minutes they spent per week participating in various types of activity, as well as the total duration for all activities. When it came to the average duration of sessions, participants typically spent a longer amount of time per session participating in outdoor AT activities, followed by traditional indoor fitness, and lastly mind-body practices (see table 11).

Table 11

Average Session Duration in Minutes

Activity Type	M	SD	Min	Max
Traditional Indoor Fitness	47.16	32.67	0	120
Outdoor Adventure	66.61	85.16	0	600
Mind-Body Practices	26.91	54.93	0	120
Total Sessions	137.88	114.96	0	700

Results for Average Duration of Sessions

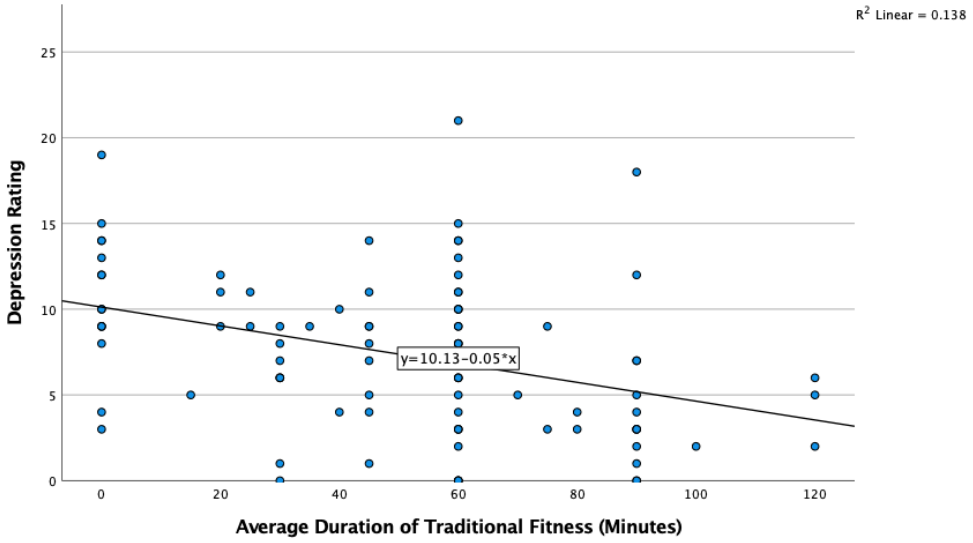
It was hypothesized that people who engaged in activity sessions of longer duration (minutes per session) would have better self-perception ratings for anxiety, depression, and HRQoL. For anxiety and depression, the relationships were expected to be negative, and for HRQoL, the relationship was expected to be positive. However, again, it was unclear if some relationships would be stronger than others based on the type of activity.

Traditional Indoor Fitness

Findings demonstrated that the average duration of traditional indoor activities was significantly related to self-perceived levels of depression ($p < .05$). The longer the sessions were, the lower the depression ratings were (see figure 9).

Figure 9

9. Correlation of Depression and Average Duration of Traditional Fitness



Findings indicated that the average duration of traditional indoor fitness activities was significantly related to self-perceived physical HRQoL (r = .298, $p < .001$), with a positive relationship (see figure 10). The longer the sessions were, the higher the self-perceived physical HRQoL scores. The relationship was also significant for total HRQoL (r = .4, p < .001). The longer the sessions were, the higher the self-perceived total HRQoL scores (see figure 11).

The correlation between the average duration per session for traditional indoor fitness and self-perceived rating of anxiety, however, was not significant.

Figure 10

10. Correlation of Physical HRQoL and Duration of Traditional Fitness Activities

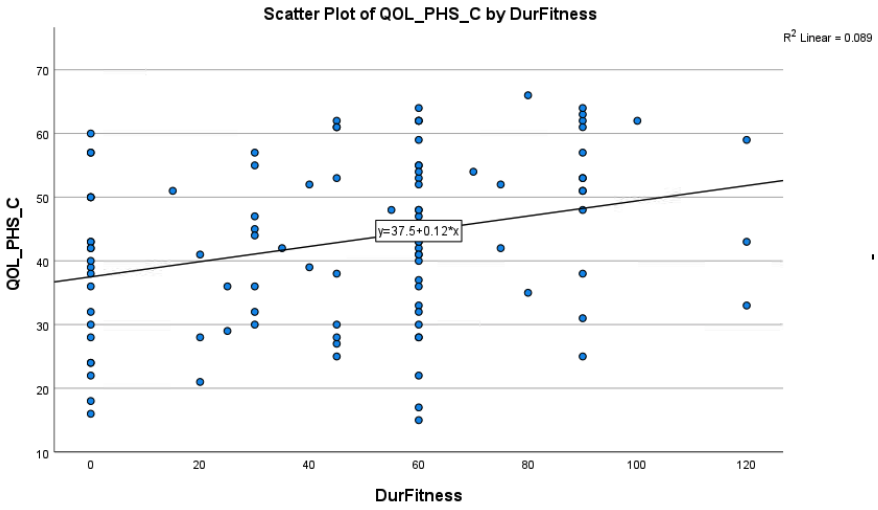
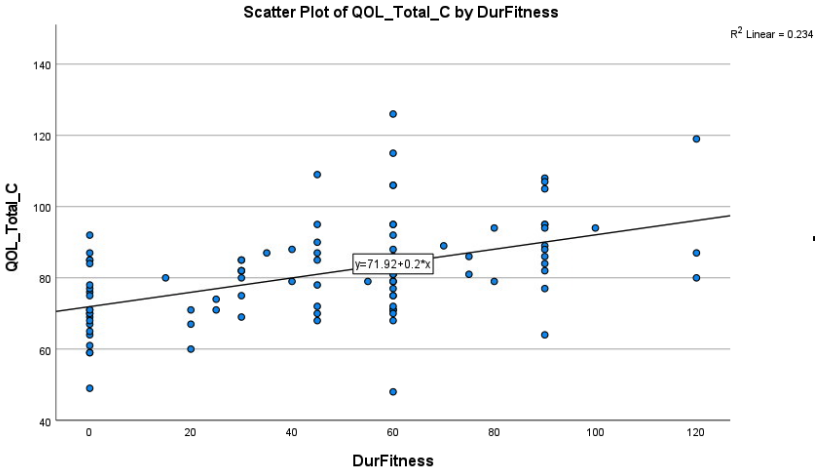


Figure 11

11. Correlation of Total HRQoL and Duration of Traditional Fitness Activities

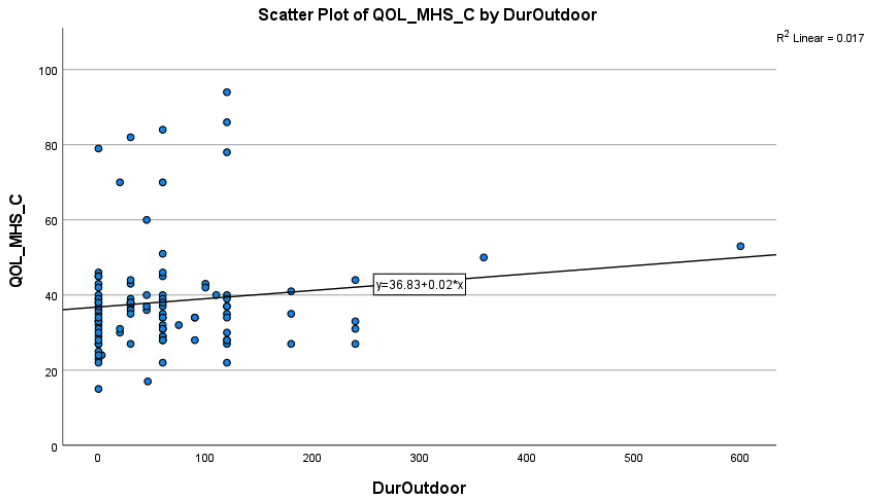


Outdoor Adventure Therapy

Findings indicated that the average duration of outdoor AT sessions was significantly related to self-perceived mental HRQoL scores (r = .27, p = .007) (see figure 12). There were no significant relationships found between the average duration of outdoor AT sessions and self-perceived ratings of anxiety or depression.

Figure 12

12. Correlation of Mental HRQoL and Duration of Outdoor Adventure Sessions



Mind-Body Practices

Again, no significant relationships were found between the average duration of mind-body sessions and self-perceived ratings.

Total Activities

Findings also indicated that the average duration of all activities combined was significantly related to self-perceived mental HRQoL scores (r = .275, p = .005). The longer

one spent per session for all of their recreational activities, the better their mental HRQoL appeared to be (see figure 13).

Figure 13

13. Correlation of Mental HRQoL and Duration of All Activities

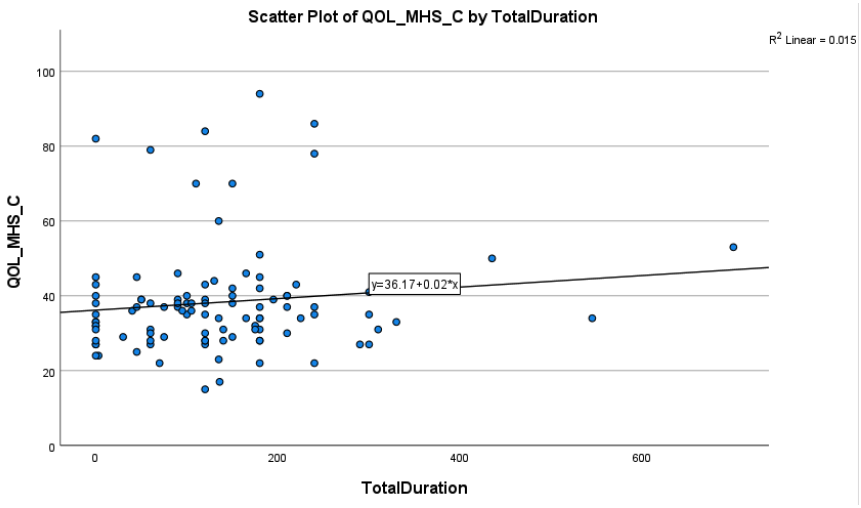


Table 12 depicts a summary of the significance of all the duration categories and their *p* values.

Table 12

Duration vs. Self-Perceived Ratings Correlation p Values

Activity Type	Anxiety	Depression	Physical HRQoL	Mental HRQoL	Total HRQoL
Traditional Indoor Fitness	0.104	< .001* (*r* = -371)	< .001* (r = 298)	0.074	< .001* (r = .4)
Outdoor Adventure Therapy	0.645	0.313	0.47	.007* (r =.27)	0.115
Mind-Body Practices	0.273	0.68	0.32	0.43	0.7
Total Duration	0.736	0.118	0.91	.005* (r = .275)	0.072

Note: The asterisk represents the relationships that were found to be significant.

Research Question 2

What is the relationship between the frequency of sessions participating in activities of various intensity levels (strenuous, moderate, or mild) and self-perceived ratings of mental health (depression, anxiety, and HRQoL)?

Participant Information for Activities of Varying Intensity Levels

Participants were asked to report the average number of sessions per week that they spent engaging in activities of varying intensity levels for more than 15 minutes at a time. Table 13 summarizes the descriptive statistics for each of these levels. Strenuous activities were described as “heart beats rapidly” and included examples such as running, hockey, football, soccer, basketball, cross country skiing, vigorous swimming, and vigorous bicycling. Moderate activities were described as “not exhausting” and included examples

such as fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, and dancing. Mild/low activity was described as 'minimal effort' and included examples such as yoga, archery, fishing, bowling, horseshoes, golf, and easy walking. The mean number of days spent engaging in activity types of varying intensity levels was about two days per week across the board.

Table 13

Number of Days per Week Engaging in Various Intensity Levels

Intensity Level	M	SD	Min	Max
Strenuous Energy	2.17	1.95	0	7
Moderate Energy	2.01	1.95	0	7
Mild Energy	2.31	2.16	0	7

Results for Activities of Varying Intensity Levels

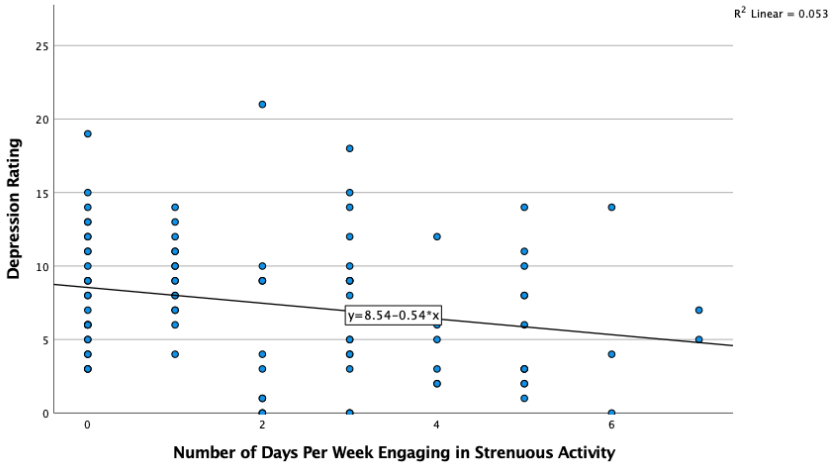
It was hypothesized that activities of more strenuous intensity levels would be correlated with better self-perception ratings for anxiety, depression, and HRQoL.

Strenuous Intensity Activity

Findings indicated that the average number of strenuous activity sessions per week was significantly related to depression (r = -.23, p = .021). The higher number of strenuous activity sessions per week correlated with improved depression self-ratings (see figure 14).

Figure 14

14. Correlation Between Depression and Number of Days per Week of Strenuous Activity



Results also found the relationship between the number of strenuous activity sessions per week and physical HRQoL to be significant (r = .31, p = .002). More days participating in more strenuous activities correlated with higher physical HRQoL scores (see figure 15). The relationship was also significant for the number of strenuous activity sessions per week and total HRQoL (r = .41, p < .001). More days participating in more strenuous activities correlated with higher total HRQoL scores (see figure 16). There was no significant relationship between the number of strenuous activity sessions and anxiety.

Figure 15

15. Correlation Between Physical HRQoL and Number of Days of Strenuous Activity

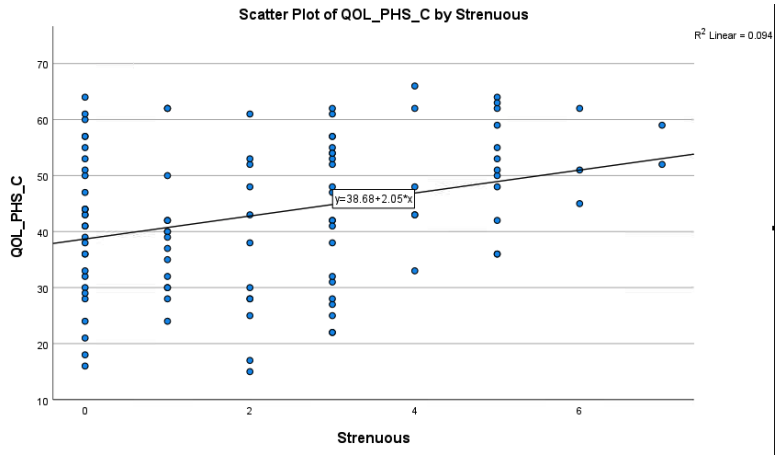
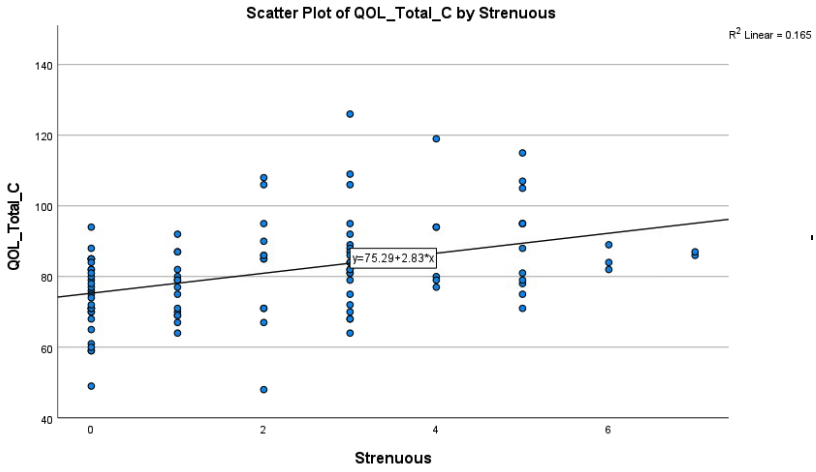


Figure 16

16. Correlation Between Total HRQoL and Number of Days of Strenuous Activity



Moderate and Mild Intensity Activity

There were no significant relationships between the number of moderate intensity activity sessions per week and the self-perceived ratings of depression, anxiety, or HRQoL.

The same applied for the number of days per week participating in mild intensity activity sessions self-perceived ratings. Table 14 depicts a summary of significance.

Table 14

Intensity vs. Self-Perceived Ratings Correlation p Values

Activity Type	Anxiety	Depression	Physical HRQoL	Mental HRQoL	Total HRQoL
Strenuous	0.68	<.001* (r = .54)	.002* (r = .31)	0.296	<.001 (r = .41)
Moderate	0.68	0.32	0.07	0.51	0.3
Mild	0.56	0.73	0.338	0.56	0.78

Note: The asterisk represents the relationships that were significant.

Research Question 3

Participant Information for Activity Preference

Participants were asked to report which of the three activity types they *preferred* to participate in most often. This self-reported question aimed to uncover what activity type they enjoyed but did not shed light into how often they participated in that activity. The majority of participants preferred traditional indoor fitness, followed closely by outdoor AT, as seen in table 15. Only 10 participants reported to prefer mind-body practices.

Table 15

Number of Participants who Preferred Each Activity Type

Activity Preference	Number of Participants
Traditional Indoor Fitness	51
Outdoor Adventure Therapy	41
Mind-Body Practices	10

Results for Activity Preference

A one-way ANOVA was used to see if there were any significant differences in the average self-perceived rating between groups who preferred traditional indoor fitness, outdoor AT, or mind-body practices. The results of the one-way ANOVA showed significant effect of activity preference on the average self-perceived rating for total HRQoL ($F(2, 99) = 4.84$, $p = .01$). There were significant differences found for the average total HRQoL scores for groups who preferred different activity types.

The average self-perceived rating for total HRQoL was highest for participants who preferred traditional indoor fitness, with an average raw score of 84.96, followed by those who preferred outdoor AT with an average raw score of 79.24, and lastly those who preferred mind-body practices with an average raw score of 72.3. A post hoc Tukey test then showed that the significant difference existed between the group who preferred mind-body practices and the group who preferred traditional indoor fitness, with self-perceived total HRQoL being significantly higher for those who preferred traditional fitness activities ($p = .01$). Equal variances of each comparison group were confirmed using the test of homogeneity of variances.

There was no significant relationship of activity preference on the average self-perceived rating for depression ($F(2,101) = .018$, $p > .05$). There was also no significant relationship of activity preference on the average self-perceived rating for anxiety ($F(2,101) = 2.189$, $p > .05$). Again, participants were given a score between zero and 21 for anxiety and depression, where scores were considered ‘normal’ if they were between zero and seven, ‘borderline abnormal’ if between eight and ten, and ‘abnormal’ if between 11-21. For

HRQoL, the scores on the VR-12 range from 0-50 for each physical HRQoL and mental HRQoL, with a higher score indicating higher HRQoL.

Table 16 depicts a chart of the average scores based on activity preference. Table 17 shows the mean and standard deviation of total HRQoL, specifically for the three activity groups. Figure 17 displays the means for total HRQoL based on preference for each activity type.

Table 16

Average Self-Perceived Ratings (Raw Score) Based on Activity Preference

Activity Type	Anxiety Mean	Depression Mean	Physical HRQoL Mean	Mental HRQoL Mean	Total HRQoL Mean
Traditional Fitness	9.55	7.41	45.25	39.71	84.96
Outdoor Adventure Therapy	10.56	7.59	42.12	37.12	79.24
Mind-Body Practices	12.7	7.6	36.4	35.90	72.3
p value	0.117	0.982	0.12	0.61	.01*

Note: The asterisk represents a significance difference in the means.

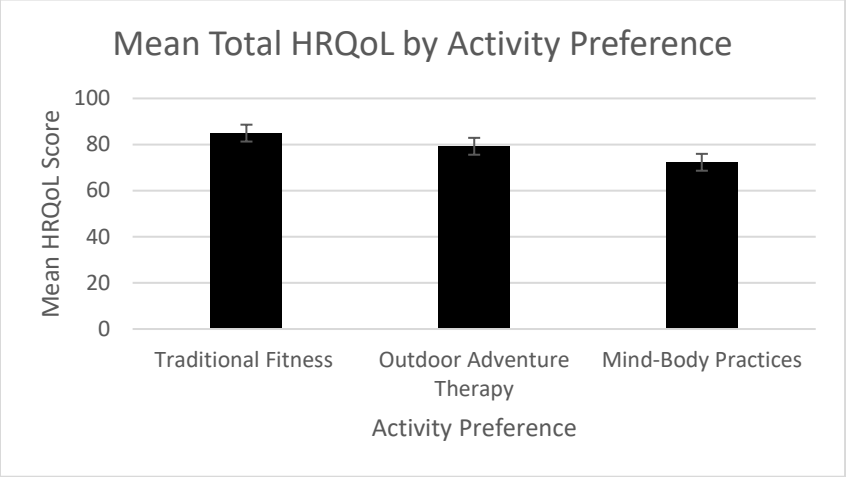
Table 17

Total HRQoL by Activity Type Preference

Activity Type	M Total HRQoL	SD Total HRQoL
Traditional Fitness	84.96	14.74
Outdoor Adventure Therapy	79.24	12.01
Mind-Body Practices	72.3	12.01

Figure 17

17. Mean Total HRQoL for Different Activity Types



Results Summary

The main results that emerged from this study were that there were several negative significant relationships found with physical activity and depression. There were also some positive significant relationships found with physical activity and both physical and total HRQoL There was a a positive significant relationship found with outdoor adventure therapy and mental HRQoL. There were no conclusive relationships found concerning anxiety. Table 18 depicts a snapshot of these themes and results.

Table 18

Results Summarized

Summary of Statistical Significance at alpha of .05: Main Findings	
Traditional Fitness	
Increased frequency	Significant for lower depression Significant for higher physical HRQoL Significant for higher total HRQoL
Increased duration	Significant for lower depression Significant for higher physical HRQoL Significant for higher total HRQoL
Outdoor Adventure Therapy	
Increased frequency	Significant for lower depression Significant for higher total HRQoL
Increased duration:	Significant for higher mental HRQoL
Activity Preference	Higher average HRQoL scores for those who prefer traditional indoor fitness than those who prefer mind-body practices
Total Sessions	
Increased frequency	Significant for lower depression Significant for higher physical HRQoL Significant for higher total HRQoL
Increased duration:	Significant for higher mental HRQoL
Strenuous Activity	
Increased # of sessions per week	Significant for lower depression Significant for higher physical HRQoL Significant for higher total HRQoL

Table 19 represents the significant relationships found when it came to demographic information.

Table 19

Demographic Results Summarized

Summary of Statistical Significance at alpha of .05: Additional Findings	
Demographic Factors	Depression is positively correlated with age Depression is significantly higher for those currently in treatment than those not in treatment HRQoL is significantly higher for those who have been in treatment in the past six months than those who have not

Implications of Results for Substance Use and PTSD Symptoms

In order to relate the self-perceived mental health ratings of anxiety, depression, and HRQoL to substance use and PTSD symptom severity, correlations between the ratings and measures for substance use and PTSD symptom severity were run. Several significant relationships were exposed that showed how better self-perceived mental health ratings meant improved SUD and PTSD symptoms among veterans.

As stated above, the BAM items assess: (1) risk for relapse or worsening severity of SUD, (2) protective behaviors that support recovery and resistance to relapse, and (3) use of alcohol and other substances. Lower BAM risk scores are associated with lower risk for substance issues, therefore improving symptoms. Higher BAM protective scores are associated with more measures taken to protect one from abusing substances, improving symptoms. Lower PCL-M scores are associated with less PTSD symptoms. Table 20 summarizes these relationships.

Table 20

Correlation Between Self-Perceived Ratings of Mental Health and Substance Use/PTSD Symptoms

Substance Use/ PTSD symptoms	Anxiety	Depression	Physical HRQoL	Mental HRQoL	Total HRQoL
BAM Use	0.346	0.613	0.097	0.719	.046* (r= -.198)
BAM Risk	<.001* (r = .392)	<.001* (r = .568)	.041* (r = -.203)	.027* (r = -.219)	<.001* (r = -.429)
BAM Protect	.013* (r = .245)	0.187	.046* (r = .198)	0.396	<.001* (r = .352)
PCLM	<.001* (r = .531)	<.001* (r = .6)	.035* (r = -.209)	0.143	<.001* (r = -.357)

Results from the correlations found a significant relationship between the following variables: for BAM Risk Scores, the negative relationships between physical, mental, and total HRQoL scores and lower BAM risk scores were significant [(r = -.203, p = .041); (r = -.219, p = .027); and (r = - .198, p = .046)], respectively. The higher the scores on the HRQoL reports, the lower the risk for substance misuse. Similarly, results found the positive relationship between depression and lower BAM risk to be significant (r = .568, p <.001). The lower the depression symptoms reported, the lower risk for substance abuse relapse.

For BAM protective measures, results found the positive relationships between physical and total HRQoL and BAM protection scores to be significant [(r = .198, p = .046); and (r = .352, p < .001)], respectively. The higher the scores on the HRQoL measures, the more substance abuse protective measures were taken.

Findings also found the positive relationship between depression and PCL-M scores to be significant ($r = .6$, $p < .001$). The lower the symptoms of depression reported, the less PTSD symptoms reported. Finally, results found the negative relationships between physical and total HRQoL scores and PCL-M scores to be significant [($r = - .209$, $p = .035$); ($r = -.357$, $p < .001$)], respectively. The higher the HRQoL scores were, the less PTSD symptoms were reported.

While anxiety self-perceived ratings and substance use and PTSD symptoms were significant, this study did not show any significant relationships between anxiety and physical activity participation variables and therefore were not discussed above.

CHAPTER V

DISCUSSION

The purpose of this study was to explore how factors of participation in RT activities (activity type, frequency, duration, and intensity) related to self-perceived levels of anxiety, depression, and HRQoL in veterans at an increased risk of PTSD and SUD. Physical activity interventions of different types, intensities, and domains of movement may present as treatment options for veterans with fewer stigmas than those in traditional medical settings. It aimed to identify correlations between different types of activities, how often they are performed, and how long they are performed, with self-perceived ratings of mental and physical health. The goal was to identify significant relationships between variables in order to recommend how certain aspects of physical activity can be leveraged to improve the mental and physical health of veterans.

Findings

Findings that emerged from this study were that there were several significant relationships found, suggesting positive effect of physical activity on depression. There were also relationships concerning physical HRQoL and total HRQoL with physical activity participation variables, suggesting positive effect of physical activity on physical HRQoL and total HRQoL There was a general lack of conclusive relationships found concerning anxiety.

Traditional Indoor Fitness

On average, participants in this study participated in three traditional indoor fitness sessions per week, for an average of forty-seven minutes per session. When it came to traditional indoor fitness, the frequency of sessions, as well as duration in minutes per session, were negatively significantly related to depression scores. More sessions and longer durations were related to lower depression scores. These findings are not surprising, as these types of activities have shown to release endorphins in the brain and opiate molecules, which elicit similar effects of drug and alcohol use (Landale, 2012). Several studies have found that participation in fitness activities helps lessen symptoms of depression, whether through blocking negative thoughts or distracting from daily worries, improving mood and sleep patterns, and changing levels of natural chemicals in the brain.

Traditional indoor fitness encompasses aerobic and strength training exercises that focus on burning calories, improving cardioratory function, and improving muscle strength and endurance. These types of activities often require more strenuous intensity levels where one's heart rate is elevated and breathing requires more energy. It is therefore not surprising that strenuous activity was also significantly related to depression, where an increased number of high intensity sessions predicted lower depression scores. On average, participants participated in two sessions of strenuous intensity level per week. Studies have shown that exercise could lead to a causal decrease in substance use by producing protective effects in procedures that mirror phases during the development of, and recovery of, a SUD (Smith & Lynch, 2012). This study suggests that traditional indoor fitness activities and strenuous

activities are more effective than other types of physical activity for lowering one's depression.

Because this was a correlation study, the opposite applies as well. The less depression symptoms they experienced, the more their participation in traditional indoor fitness was. Again, because of the nature of the study, it is unclear whether participation actually lowered their depression, or if people who were less depressed had more motivation to pursue these activities.

This type of activity was also positively significantly related to physical HRQoL and total HRQoL, meaning the combined score of physical and mental HRQoL individual scores. More traditional fitness activity correlated with both higher physical HRQoL scores and total HRQoL scores. In looking at frequency and duration of participation in traditional fitness activities and activities of strenuous intensity levels, results indicated that the more sessions individuals participated in, the higher their physical HRQoL score and total HRQoL were. Traditional indoor fitness did not, however, have any significant relationship with mental HRQoL scores.

Because this was a correlation study, the opposite applies as well. The better their HRQoL scores, the more their participation in traditional indoor fitness was. Again, because of the nature of the study, it is unclear whether participation actually improved HRQoL, or if people who had a better quality of life had more motivation to pursue these activities.

Another interesting finding was that when asked what type of activity participants *preferred* to participate in, those who chose traditional indoor fitness activities had significantly higher total HRQoL scores than those who selected mind-body practices. These

findings could provide additional insight into traditional indoor fitness having a positive effect on HRQoL.

Mind-Body Practices

As discussed earlier in this paper, one of the most commonly used interventions to address issues in the management and treatment of stress and mental health problems such as PTSD, depression, and substance use includes stress management/relaxation therapy, acupuncture, progressive muscle relaxation, guided imagery, chiropractic, and mindfulness meditation (Herman, Sorbero, & Sims-Columbia, 2017). These types of activities are similar to those categorized as mind-body activities. Activities such as yoga, moving meditation, Pilates, relaxation techniques, and tai-chi encourage one to be present and calm as well as to focus. Research suggests that there is a strong connection between one's physical health and their thoughts, feelings, and emotions. Known as the mind-body connection, these types of activities strengthen these relationships and could be a better method of improving HRQoL.

In this study, however, there were no significant relationships found between frequency or duration of mind-body practices and any of the self-perceived mental health ratings. This is most likely attributed to the fact that on average, participants only participated in mind-body practices once a week and for only twenty-five minutes per session. With such little participation, it may be difficult to prove that this type of intervention was impacting participants' self-perceived mental health ratings in a positive or negative way.

Outdoor Adventure Therapy

Findings indicated that the average frequency of outdoor AT sessions was negatively significantly related to self-perceived levels of depression ($p = .002$); the more sessions

attended, the lower the depression ratings were. This was not surprising due to previous research suggesting that the more sessions of activity and exercise, the more improved mood and well-being were. For example, Lundberg, Bennett, and Smith's (2011) study results showed improved psychological health and improved mood states for veterans with injuries following participation in outdoor adaptive sports, such as waterskiing, kayaking, river rafting, canoeing, fly-fishing, Nordic and alpine snow skiing, snowboarding, and ice skating. Similarly, Bennett et al.'s, (2017) study of veterans who participated in a four-day therapeutic fly-fishing program showed results indicating a significant decrease in symptoms of posttraumatic stress, depression, perceived stress and functional impairment, and an increase in leisure satisfaction.

Findings also indicated that increased frequency of sessions participating in outdoor AT activities was positively significantly related to a higher total HRQoL score. The more sessions attended, the higher their total HRQoL. Increased duration participating in outdoor AT activities on the other hand, was positively correlated with mental HRQoL scores. The longer one spends on average participating per session in outdoor AT sessions, the better their mental HRQoL. This is consistent with Lundberg et al.'s (2011) study, which stated that there were improved psychological health, QoL, and for veterans following participation in outdoor adaptive sports opportunities.

This study, however, did not prove significance in the relationships between participation in outdoor AT sessions and self-perceived ratings of anxiety.

Total Activity

In looking at the total number of sessions of activity, regardless of type, findings indicated that the average frequency was negatively significantly related to self-perceived levels of depression. The more sessions that were attended, the lower the depression score ratings were. According to the literature discussed, not only does exercise increase the ability to cope through difficult situations, studies have shown that exercise could lead to a causal decrease in depression as well as substance use by producing protective effects in procedures that mirror phases during the development of, and recovery of, a SUD (Smith & Lynch, 2012).

This study supported that conclusion when it came to the total number of activity sessions, regardless of the type of activity. Findings also indicated that the average frequency of total sessions was positively significantly related to higher physical HRQoL and higher total HRQoL, meaning the more sessions participated in, regardless of activity type, the better HRQoL and physical HRQoL. The average duration of total sessions was positively significantly related to mental HRQoL, meaning the longer one participates in activities, regardless of activity type, the better their mental HRQoL was.

Limitations

This was a preliminary, correlational study conducted to see if there were any relationships between veterans at an increased risk for mental health issues and participation in RT physical activities. This approach provided an opportunity to identify which methods of physical activity may be the most beneficial to assist in the well-being of veterans. While this study can offer valuable information to RT and mental health professions that provide

care for veterans with mental health issues such as PTSD and SUD, limitations of this study need to be considered. Since participants were recruited through social media and email, all veterans and active duty service members were able to participate. This allowed for those who potentially had no symptoms of PTSD, SUD, or mental health issues to complete the survey. Additionally, individuals who participated did not need to have a formal, clinical diagnosis of a mental health condition for participation. Screening criteria was based on the reliance of self-reported metrics of symptoms of PTSD and SUD using the PCL-M and the BAM, and participation in physical activity opportunities from recall from the veterans. Often, individuals with these issues do not see the severity of their symptoms, therefore rating themselves lower on the scales.

Due to the small/unique sample size, results may not be generalizable beyond the specific population from which the sample was drawn. As seen in the demographics, the findings are from a largely male-dominant sample. While that is similar to the military in general, with a larger population size or more women who participated, we may have been able to see if there were gender differences in the results. It is also highly likely that due to the low sample size, there was not enough participation to make the results significant due to lack of power. However, this type of study helps to lay the groundwork and identify themes for future interventional studies with similar populations in a larger sample. As physical activity questionnaires are subjective methods, the results are highly dependent on the respondent's cognition. They could also be influenced by the day of the week, the sequence of administration, and if the questionnaire was combined with other physical activity measures.

Participation in physical activities and exercise, while on one hand is medicine that can benefit all areas of health, can also be subjective and inexact. Researchers and clinical workers have long stated the benefits of physical activity and exercise, such as improving mental health, increasing functioning of organs, boosting mood, and increasing physical health, but there still can be some limitations and difficulty controlling factors that have an impact. For example, veterans with mental health issues and SUDs may also have a slew of underlying conditions such as low mood, poor diet, low sleep quality, etc. Therefore, if participants were being impacted the day of the survey, this may have skewed how they viewed past participation. Depending on how they were physically and mentally feeling at the time they completed the survey, results may have been skewed in relation to how they remembered feeling post-participation.

Other factors such as injury history, current or past fitness level, or proficiency in a certain exercise may also influence results. There are also individuals that just might not benefit from participation in a particular type of physical activity. While there is a very limited number of individuals that may experience this, there have been studies that have identified them. Some research has shown that there is a small group (about 20%) of individuals, known as “non- or low-responders” that have difficulty experiencing the benefits of participating in physical activity like many individuals (Montero & Lundby, 2017). More recent research has suggested that non-responders to one type of exercise may benefit from another type, or longer, more intense sessions. This information can serve as information for future studies to consider.

Suggestions for Future Research

Given the results of this study, along with existing research and literature with other populations, military members and veterans at an increased risk for PTSD, SUD, and other mental health issues such as depression and low HRQoL may benefit from participation in some sort of physical activity. It is important for additional studies to be conducted on the relationship between RT and symptoms of PTSD, SUD, and other mental health issues. Further research is needed on specific types of physical activity opportunities, such as cardio, aerobic, anaerobic, weightlifting, or other types that would be beneficial in lowering symptoms of PTSD, SUD, depression, and anxiety. This initial study did suggest that participation in physical activity opportunities does provide an innovative approach to treating veterans with these types of symptoms. Additionally, it may be helpful to assess individual versus group fitness activities to analyze how social support would be beneficial.

Future research should be more interventional or observational as well, in a lab, fitness center, program, or other. Direct observations and self-reports in real time could be helpful. Additional studies should include clinically diagnosed PTSD, SUDs, or other mental health disorders, and could benefit from alternate measures used that assess only physical activity participation. There is an increasing amount of research to suggest that there is a beneficial relationship between exercise and physical activity and mental health issues in veterans. There is also evidence that supports these alternative types of interventions to be used with multiple types of issues that veterans may face. However, future research could look more specifically at intensities with regard to physical changes in bodily activity,

duration, and frequency with regard to real-time participation, and modalities that include more specific programming.

In many studies conducted surrounding this area of study, results indicated that participating in regular, daily activity has extreme benefits, including improving health, reducing the risk of developing chronic conditions, and more importantly, improving total HRQoL. Some of the findings of this research are inconsistent with other studies investigating the number of sessions of exercise veterans participate in in response to anxiety mental health scores since there were no significant relationships concerning anxiety and physical activity participation variables. This finding states the need for further studies to be conducted to assess if this is the case in veterans with confirmed diagnoses of PTSD, SUD, or other mental health issues. Not every intervention will work for all individuals. As seen in the literature, some techniques, such as pharmacology or psychotherapy work well for some, while a whole health approach might work better for others. For some, it might be a combination of some or all the techniques.

Both major categories of findings related to activity, depression, and HRQoL present interesting topics for future experimental research projects. The first topic for a future experimental research project is to explore if strenuous, traditional indoor fitness activity participation intervention could increase one's physical and total HRQoL over a period of time. A second topic for further exploration could be an experimental research project to determine if strenuous, traditional fitness activity participation intervention could decrease one's depression symptoms over a period of time. Both options may present as treatment options with fewer stigmas than those in traditional medical settings and an individual may

benefit from one, the other, or even both, based on their level of symptoms of depression and HRQoL. The third topic could be an experimental research project to determine if a combination of increased frequency and duration of outdoor AT combined could improve depression and both components of HRQoL.

There are also a few additional topics for further exploration. One would be to explore reasons why physical activity participation variables do not seem to correlate significantly with anxiety or mental HRQoL (aside from increased duration of outdoor AT sessions as well as total sessions correlating with better mental HRQoL scores) and to consider other interventions that may be able to help with these issues. The other would be to explore if participation in more than one session per week of mind-body practices could have an impact on any of the self-perceived mental health ratings, since low participation in that type of activity did not show any impact or improved ratings.

Recommendations for Policy and Practice

Complementary and integrative health approaches have been streamlined as interventions used to help improve veterans' mental health, stabilize pain management, and promote overall general wellness and QoL within many healthcare systems. However, there has been a lack of rigorously tested interventions through formal research. While researchers continue to work towards filling these gaps, these types of studies are needed to provide baseline assessments of what can be effective intervention strategies in helping to increase the number of veterans who seek help through the VA system. Focusing solely on the medical model and presence of illness or disease will largely impair the progress of designing effective, highly successful interventions for veterans with mental health issues. As can be

seen in the growing research in the community, the use of alternate and complementary physical activity interventions can have practical implications for larger, more diverse populations.

Utilizing RT physical activity opportunities as a key part of the transdisciplinary team treatment options could provide more veterans with successful rehabilitation and return to a more optimal lifestyle (Pedersen & Saltin, 2015). As we know, physical activity is an integral part of both health protection and health promotion, especially within this population. Research has shown that there are numerous beneficial effects, and the link between participation in physical activities and health has been well established. There has been definitive, scientific evidence that has shown the health benefits of physical activity for veteran groups to include, but not limited to reduced stress levels, lower risk of chronic conditions, better overall functioning health, improved cardiorespiratory and muscular fitness, and improved sleep quality (Goldstein et al., 2018). All these things combined with other effective treatment modalities have the promise to improve the overall physical and mental health and well-being of veterans.

Through the inclusion of CIH opportunities for veterans, such as exercise, mindfulness and relaxation techniques, along with outdoor AT opportunities, negative mental health issues such as depression and lower HRQoL can be improved. While previous research has shown that these types of interventions also can help to improve anxiety symptoms, this study did not show this. However, that is not to say that these types of interventions are not beneficial. Not only can these opportunities help to reduce the negative

symptoms of PTSD and SUD but can also act as a protective measure for these issues as well.

For military members and veterans to feel secure and safe from stigma in receiving mental health care, it would be helpful for those individuals to receive a prescription or gain access to RT physical activity opportunities, such as traditional indoor fitness, outdoor AT, and mind-body practices. While these opportunities are provided at most VA facilities, they are not typically "prescribed" to veterans who may benefit, but merely suggested. Often, to gain access to these types of programs, referral from a recommendation or a trustworthy source is needed. All members of the transdisciplinary team assisting veterans should be educated and encouraged to use RT as an effective treatment tool. Through the collaboration of direct care health workers, individuals being seen for a variety of issues and health obstacles can be recommended to try these opportunities first, before having to go straight to medication and more intense therapies.

For veterans who are struggling with mental health issues, such as PTSD, SUD, anxiety, depression, etc., isolation and a lack of help-seeking behaviors is common. Their main source of support might be the VA system, where the current scope of practice is not to refer directly, but should be. It is noteworthy to insist the VA healthcare system extend its scope of practice to include all aspects of health and wellness, and to utilize the discipline of physical activity, exercise, and especially, RT, to improve the health and well-being of all veterans and military members. Rosenbaum et al., (2015) has stated that physical activity has been perceived to be a neglected intervention, specifically for individuals with mental health

concerns, and with the plentiful research out there, it is time to change the general neglect of physical activity as a beneficial treatment option in healthcare.

Implications for RT Practice

As demonstrated by the results from this study, veterans at an increased risk of mental health issues appear to have optimal effect on depression by participating in moderate-to-high intensity, traditional indoor fitness sessions for longer durations. While this study did not yield specific results to coincide with previous research in the area of anxiety, it is promising that utilizing RT physical activities for veterans at an increased risk of mental health issues, such as PTSD and SUD, can help to decrease symptoms of anxiety and depression, while increasing their physical and total HRQoL, along with overall health and well-being.

As evidenced by the literature, there is a significant number of veterans who lack help-seeking behaviors for mental health issues due to the stigmatization of traditional treatment programs such as pharmacotherapies and psychotherapies (USDVA, 2018). As the RT discipline is designed to provide a unique non-pharmacological approach to health management, this suggests the need for RT interventional approaches that are not associated with clinical settings for veterans with mental health issues, such as traditional indoor fitness, to assist in this process.

As there is growing evidence-based research in the literature, RTs should continue to design, advocate and utilize physical activity interventions when working with veterans with mental health issues that focus on improving all aspects of their life to include social, emotional, and physical functioning. Where length of time and access can be limited in many

cases, it is important that educational material and community connections also be used. There are many times where due to barriers such as transportation, finances, time commitment, etc. individuals are not able to put in the adequate amount of time they may want, or need, to see effective results. Therefore, it is also part of the therapists' job to adapt programs and educate veterans on alternative ways for success.

Recreational therapists need to assist in the identification of specific goals of the veteran seeking help. After identification of goals, possible interventions and treatment options should be considered. It is important to consider evidence-based research that focus on specified goals as they relate to symptom reduction, successful recovery, behavior changes, etc., and identifying which of these interventions produces the most effective results for specific symptoms, diagnoses, and problem areas. Once a program has been identified, it is important to use a strengths-based approach and look at internal and external resources available, possible barriers, and current and/or past treatments.

Most often, treatments for mental health issues involve psychological and pharmacological interventions, however RT focused interventions are becoming increasingly popular as a means for reduction of negative symptoms. When working with veterans who are dealing with mental health issues such as SUD and PTSD, it is recommended that RTs utilize these complementary methods for medical therapy in the treatment of mental health issues. Specifically, traditional indoor fitness and strenuous activity interventions have shown to be effective in the alleviation of negative symptoms of depression and other mental health issues.

Conclusion

There appears to be no shortage of exploration around the beneficial effects of traditional medical and clinical interventions to assess mental health disorders, or research surrounding the biopsychosocial needs of veterans. There is a growing, yet lack of research to surround non-traditional interventions such as RT-based activities (traditional indoor fitness, outdoor AT, and mind-body practices) that have been noted to positively influence the recovery and enhancement of the overall quality and well-being of this population.

As research is growing surrounding the idea of using RT-based interventions to support health and well-being, health care professionals and educators need to continue to be aware of the potential benefits of utilizing these types of interventions. As the results from this study are promising to suggest additional intervention techniques for veterans, considerable research remains to be completed. However, through the inclusion of RT interventions into clinical treatment or in community settings, it is promising that the military and veteran population will find successful means of recovery and optimal well-being.

APPENDIX

A. CONSENT FORM

Qualtrics Survey

Start of Block: Informed Consent

Q1.1 Welcome to the research study!

The purpose of this research is to study the relationships between participation in specific types of recreational therapy physical activities (such as the type of activity, how long, how often, and how intense) and some questions for veterans related to any symptoms of depression, anxiety, and health-related quality of life. By examining these relationships, the hope is to predict how these participation factors might relate to mental health and the recovery process.

You will be presented with information relevant to physical activity participation preferences and asked to answer some questions about it. The types of questions on the survey will ask for information about you and symptoms for posttraumatic stress disorder, substance use disorders, or any other mental health issues, and what type of physical activity you prefer.

Please be assured that your responses will be kept completely confidential.

The study should take you around 10-15 minutes to complete, and, if you choose to provide your email address at the completion of the survey, you will be entered into a drawing for a $50 VISA gift card. The drawing will happen when the number of surveys (84) are turned in to the researcher, or after 6 months, whichever comes first. Your participation in this research is completely voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice.

Risks or Discomforts: In the unlikely event that some of the survey questions make you feel uncomfortable or upset, you are always free to decline to answer or to stop participation at any time. Should you feel discomfort after or during participation, you may seek additional help via the following: the primary investigator at krista.geden001@umb.edu or the faculty

advisor at Valerie.karr@umb.edu; UMASS Counseling Center in the Quinn Administration Building, or by phone at 617-287-5690; or the Veterans Crisis Line to speak to a qualified responder with the Department of Veterans Affairs at 1-800-273-8255 and press 1.

Confidentiality:

Your part in this research is confidential. You will not be required to present any identifying personal information. The information gathered for this project will not be published or presented in a way that would allow anyone to identify you. You must provide your email address if you would like to be entered in the drawing for the gift card. Your email address will not be connected to your survey responses.

Questions: You have the right to ask questions about this research before you agree to be in this study and at any time during the study. If you have further questions about this research or if you have research-related problem, you can reach Krista Geden-McDonagh at krista.geden001@umb.edu. You may also contact her faculty advisor Valerie Karr at Valerie.karr@umb.edu.

By clicking the button below, you acknowledge that your participation in the study is voluntary, you are over 18 years of age, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason. If for any reason during the survey you need to go back to a previous question, please use the "back" button at the bottom of the survey box instead of the buttons on the address bar for your Internet browser.

○ I consent, begin the study (1)

○ I do not consent; I do not wish to participate (2)

B. IRB SUBMISSION

December 16, 2019

Krista Geden McDonagh

SGISD

RE: Your application dated 11/18/2019 regarding study number **2019230**: EXAMINING THE RELATIONSHIP BETWEEN PARTICIPATION IN RECREATIONAL THERAPY-BASED PHYSICAL ACTIVITY PROGRAMS AND THE SYMPTOMS OF POSTTRAUMATIC STRESS DISORDER AND SUBSTANCE USE DISORDERS IN VETERANS

Dear Krista Geden McDonagh:

I have reviewed your study listed above and have determined that this study qualifies as human research that is **exempt** under the following guideline(s): 45 CFR 46.104(d)(2)

Educational tests/survey/interview procedures, or observation of public behavior. Ongoing IRB review and approval by this organization is not required. In conducting this protocol, you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

This determination applies only to the activities described in the IRB submission. If you decide to modify the project in such a way that it may no longer qualify for exemption, submit a modification request to the IRB for review prior to implementation of the modified research project.

Thank you for keeping the IRB informed of your activities.

Sincerely,

Sharon Wang, CIP, CIM

Senior IRB Administrator

C. QUALTRICS SURVEY

Start of Block: Demographics

Q2.1 What is your gender?

- Male (1)
- Female (2)
- Other (3) _____

Q2.2 What is your current age?

- 18 - 24 (1)
- 25 - 34 (2)
- 35 - 44 (3)
- 45 - 54 (4)
- 55 - 64 (5)
- 65 - 74 (6)
- 75 - 84 (7)
- 85 or older (8)

Q2.3 What is your marital status?

- Never married (1)
- Married (2)
- Divorced (3)
- Separated (4)
- Widowed (5)

Q2.4 What is your highest level of COMPLETED education?

- Less than high school (1)
- GED (2)
- High school graduate (3)
- Some college (4)
- College degree (5)
- Higher ed (6)

Q2.5 What is your ethnicity?

- White (1)
- Black or African American (2)
- American Indian or Alaska Native (3)
- Asian (4)
- Native Hawaiian or Pacific Islander (5)
- Other (6) _____

Q2.6 Which statement best describes your current employment status?

- Working (paid employee) (15)
- Working (self-employed) (16)
- Not working (retired) (17)
- Not working (disabled) (18)
- Not working (other) (19)
- Prefer not to answer (20)

Q2.7 Identify any CURRENT ACTIVE sources of support you have (i.e. specific family members, friends, organizational memberships)- Check all that apply

- ☐ Parents (1)
- ☐ Children (2)
- ☐ Significant other/spouse (3)
- ☐ Siblings (4)
- ☐ Extended Family (5)
- ☐ Groups/organizations (6)
- ☐ Friends (7)
- ☐ None (8)
- ☐ Other (9) _____

Q2.8 What was/is your branch of service?

- [ ] Army (1)
- [ ] Marines (2)
- [ ] Navy (3)
- [ ] Coast Guard (4)
- [ ] Air Force (5)
- [ ] Reserves (6)
- [ ] National Guard (7)

Q2.9 Have you ever been deployed to a combat zone?

▼ Yes (1) ... No (2)

Skip To: End of Block If Have you ever been deployed to a combat zone? = No

Q2.10 How many combat related deployments have you had?

▼ 0 (1) ... 13 (14)

Q2.11 Are you currently being treated for PTSD and/or Substance use issues?

- Yes (1)
- No (2)

Skip To: Q2.12 If Are you currently being treated for PTSD and/or Substance use issues? = Yes
Skip To: Q2.13 If Are you currently being treated for PTSD and/or Substance use issues? = No

Q2.12 Does the program offer recreational/physical activity programs as support?

- Yes (1)
- No (2)
- If yes, please explain (3) _____

Q2.13 Have you been treated for PTSD and/or Substance use issues in the past 6 months?

- Yes (1)
- No (2)

Q2.14 Did the program offer recreational/physical activity programs as support?

- Yes (1)
- No (2)
- If yes, please explain (3) _____

End of Block: Demographics

Start of Block: Physical Activity History

Q3.1 How important would you consider physical activity participation to be in your life?

- Extremely important (5)
- Very important (4)
- Moderately important (3)
- Slightly important (2)
- Not at all important (1)

Q3.2 Do you currently have an injury that prevents you from exercising or participating in physical activity?

- Yes (1)
- No (2)

End of Block: Physical Activity History

Start of Block: The time you spend doing different types of physical activity in a typical week

Q4.1 On average, please designate how many sessions per week you engage in mind-body activities. Examples include yoga, tai-chi, reiki, Pilates, tai kwon do, etc.

▼ 0 (0) ... 15 (15)

Q4.2 On average, please designate how many sessions per week you engage in traditional fitness activities. Examples include weightlifting, cardio machines, running, cross-fit, body-weight exercises, etc.

▼ 0 (0) ... 15 (15)

Q4.3 On average, please designate how many sessions per week you engage in outdoor adventure and sports activities. Examples include hiking, watersports, snow-sports, kayaking, surfing, soccer, football, etc.

▼ 0 (0) ... 15 (15)

Q4.4 What is the average duration in MINUTES PER SESSION do you typically spend participating in mind-body activities?

_____

Q4.5 What is the average duration in MINUTES PER SESSION do you typically spend participating in traditional fitness?

_____

Q4.6 What is the average duration in MINUTES PER SESSION do you typically spend participating in outdoor adventure and sports?

_____

End of Block: The time you spend doing different types of physical activity in a typical week

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Start of Block: Preference

Q5.1 IN GENERAL, do you prefer to participate in:

- Group exercise/physical activity (1)
- Individual exercise/physical activity (2)

Q5.2 IN GENERAL, do you prefer to participate in:

- Traditional fitness (running on treadmill, stationary bike, strength training/muscle building, lifting weights, etc.) (1)
- Outdoor adventure and sports (kayaking, hiking, running outdoors, snow-sports, watersports, etc.) (2)
- Mind-body activities (yoga, Pilates, tai-chi, relaxation, etc.) (3)

End of Block: Preference

Start of Block: Godin Leisure-Time Exercise

Q6.1 During a typical 7-Day period (a week), how many times ON AVERAGE do you do the following kinds of exercise for more than 15 minutes a day during your free time (choose the appropriate response)?

Q6.2 STRENUOUS/VIGOROUS ACTIVITY (HEART BEATS RAPIDLY) (e.g., running, jogging, hockey, football, soccer, basketball, cross country skiing, vigorous swimming, vigorous long-distance bicycling, etc.)

▼ 0 (0) ... 7 (7)

Q6.3 MODERATE ACTIVITY (NOT EXHAUSTING) (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, dancing)

▼ 0 (0) ... 7 (7)

Q6.4 MILD/LOW EXERCISE (MINIMAL EFFORT) (e.g., yoga, archery, fishing from riverbank, bowling, horseshoes, golf, snow-mobiling, easy walking)

▼ 0 (0) ... 7 (7)

End of Block: Godin Leisure-Time Exercise

Start of Block: PCL-M

Q7.1 Below is a list of problems and complaints that veterans sometimes have in response to stressful military experiences. Please read each one carefully, please check the box that indicates how much you have been bothered by that problem IN THE LAST MONTH

Q7.2 Repeated, disturbing memories, thoughts, or images of a stressful military experience from the past

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.3 Repeated, disturbing dreams of a stressful military experience from the past

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.4 Sudden acting or feeling as if a stressful military experience were happening again (as if you were reliving it)

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.5 Feeling very upset when something reminded you of a stressful military experience

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.6 Having physical reactions (e.g., heart pounding, trouble breathing, or sweating) when something reminded you of a stressful military experience from the past

- Not at all (1)
- A little bit (2)
- Mo derately (3)
- Qui te a bit (4)
- Ext remely (5)

Q7.7 Avoid thinking about or talking about a stressful military experience from the past or avoid having feelings related to it

- Not at all (1)
- A little bit (2)
- Mo derately (3)
- Qui te a bit (4)
- Ext remely (5)

Q7.8 Trouble remembering important parts of a stressful military experience from the past

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.9 Loss of interest in things that you used to enjoy

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.10 Feeling distant or cut off from other people

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.11 Feeling emotionally numb or being unable to have loving feelings for those close to you

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.12 Feeling as if your future will somehow be cut short

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.13 Trouble falling asleep or staying asleep

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.14 Feeling irritable or having angry outbursts

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.15 Having difficulty concentrating

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.16 Being "super alert" or watchful on guard

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.17 Feeling jumpy or easily startled

- ○ Not at all (1)
- ○ A little bit (2)
- ○ Mo derately (3)
- ○ Qui te a bit (4)
- ○ Ext remely (5)

Q7.18 Avoid activities or situations because they remind you of a stressful military experience

- Not at all (1)
- A little bit (2)
- Mo derately (3)
- Qui te a bit (4)
- Ext remely (5)

End of Block: PCL-M

Start of Block: BAM

Q8.1 The next set of questions is about several areas of your life such as your health, alcohol, and drug use, etc. The questions generally ask about the past 30 days. Please consider each question and answer as accurately as possible.

Q8.2
In the past 30 days, would you say your physical health has been

- ○ Excellent (0)
- ○ Very good (1)
- ○ Good (2)
- ○ Fair (3)
- ○ Poor (4)

Q8.3 In the past 30 days, how many nights did you have trouble falling asleep or staying asleep?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

Q8.4
In the past 30 days, how many days have you felt depressed, anxious, angry, or very upset throughout most of the day?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

Q8.5 In the past 30 days, how many days did you drink ANY alcohol?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

Skip To: Q8.7 If In the past 30 days, how many days did you drink ANY alcohol? = 0

Q8.6 In the past 30 days, how many days did you have at least 5 drinks (if you are a man) or at least 4 drinks (if you are a woman)? (One drink is considered one shot of hard liquor (1.5 oz) or 12-ounce can/bottle of beer or 5 oz glass of wine)

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

X→

Q8.7 In the past 30 days, how many days did you use any illegal/street drugs or abuse any prescription medications?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

X→

Q8.8 In the past 30 days, how many days did you use Marijuana (cannabis, pot, weed)?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

X→

Q8.9 In the past 30 days, how many days did you use Sedatives/Tranquilizers (e.g., “benzos”, Valium, Xanax, Ativan, Ambien, “barbs”, Phenobarbital, downers, etc.)?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

X→

Q8.10 In the past 30 days, how many days did you use Cocaine/Crack?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

X→

Q8.11 In the past 30 days, how many days did you use Other Stimulants (e.g., amphetamine, methamphetamine, Dexedrine, Ritalin, Adderall, “speed”, “crystal meth”, “ice”, etc.)?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

X→

Q8.12 In the past 30 days, how many days did you use Opiates (e.g., Heroin, Morphine, Dilaudid, Demerol, Ocycontine, oxy, codeine, Tylenol 2,3,4, Percocet, Vicodin, Fentanyl, etc.)?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

X→

Q8.13 In the past 30 days, how many days did you use Inhalants (glues/adhesives, nail polish remover, paint thinner, etc.)?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

X→

Q8.14 In the past 30 days, how many days did you use Other drugs (steroids, non-prescription sleep/diet pills, Benadryl, Ephedra, other over the counter/unknown medications)?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

X→

Q8.15 In the past 30 days, how much were you bothered by cravings or urges to drink alcohol or use drugs?

- ○ Not at all (0)
- ○ Slightly (1)
- ○ Moderately (2)
- ○ Considerably (3)
- ○ Extremely (4)

X→

Q8.16 How confident are you in your ability to be completely abstinent (clean) from alcohol and drugs in the next 30 days?

- ○ Not at all (0)
- ○ Slightly (1)
- ○ Moderately (2)
- ○ Considerably (3)
- ○ Extremely (4)

X→

Q8.17 In the past 30 days, how many days did you attend self-help meeting like AA or NA to support your recovery?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

X→

Q8.18 In the past 30 days, how many days were you in any situations or with any people that might put you at an increased risk for using alcohol or drugs (i.e., around risky “people, places or things”)?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

X→

Q8.19 In the past 30 days, how many days did you spend much of the time at work, school, or doing volunteer work?

- ○ 0 (0)
- ○ 1-3 (1)
- ○ 4-8 (2)
- ○ 9-15 (3)
- ○ 16-30 (4)

X→

Q8.20 Does your religion or spirituality help support your recovery?

- Not at all (0)
- Sli ghtly (1)
- Mo derately (2)
- Co nsiderably (3)
- Ext remely (4)

Q8.21 Do you have enough income (from legal sources) to pay for necessities such as housing, transportation, food and clothing for yourself and your dependents?

- No (1)
- Ye s (2)

Q8.22 In the past 30 days, how much have you been bothered by arguments or problems getting along with any family members or friends?

- Not at all (0)
- Sli ghtly (1)
- Mo derately (2)
- Co nsiderably (3)
- Ext remely (4)

X→

Q8.23 In the past 30 days, how many days were you in contact or spent time with any family members or friends who are supportive of your recovery?

- 0 (0)
- 1-3 (1)
- 4-8 (2)
- 9-15 (3)
- 16-30 (4)

X→

Q8.24 How satisfied are you with your progress toward achieving your recovery goals?

- Not at all (0)
- Sli ghtly (1)
- Mo derately (2)
- Co nsiderably (3)
- Ext remely (4)

End of Block: BAM

Start of Block: HADS

Q9.1 Tick the box beside the reply that is the closest to how you have been <u>feeling in the past week.</u>

Q9.2
I feel tense or wound up:

- Mo st of the time (3)
- A lot of the time (2)
- Fro m time to time, occasionally (1)
- Not at all (0)

Q9.3
I still enjoy the things I used to enjoy:

- ○ As much (0)
- ○ Not quite as much (1)
- ○ Only a little (2)
- ○ Hardly at all (3)

Q9.4
I get a sort of frightened feeling as if something awful is about to happen:

- ○ Very definitely and quite badly (3)
- ○ Yes, but not too badly (2)
- ○ A little, but it doesn't worry me (1)
- ○ Not at all (0)

Q9.5
I can laugh and see the funny side of things:

- ○ As much as I always could (0)
- ○ Not quite so much now (1)
- ○ Not so much now (2)
- ○ Not at all (3)

X→

Q9.6
Worrying thoughts go through my mind:

- ○ A great deal of the time (3)
- ○ A lot of the time (2)
- ○ Fro m time to time, but not too often (1)
- ○ Onl y occasionally (0)

X→

Q9.7
I feel cheerful:

- Most of the time (0)
- Sometimes (1)
- Not often (2)
- Not at all (3)

Q9.8
I can sit at ease and feel relaxed:

- Definitely (0)
- Usually (1)
- Not often (2)
- Not at all (3)

Q9.9
I feel as if I am slowed down:

- Ne arly all the time (3)
- Ver y often (2)
- So metimes (1)
- Not at all (0)

Q9.10
I get sort of frightened feeling like "butterflies" in the stomach:

- Ne arly all the time (3)
- Ver y often (2)
- So metimes (1)
- Not at all (0)

Q9.11
I have lost interest in my appearance:

- Definitely (3)
- I don't take as much care as I should (2)
- I may not take quite as much care (1)
- I take just as much care as ever (0)

Q9.12
I feel restless as I must be on the move:

- Very much indeed (3)
- Quite a lot (2)
- Not very much (1)
- Not at all (0)

Q9.13
I look forward with enjoyment to things:

- ○ As much as I ever did (0)
- ○ Rather less than I used to (1)
- ○ Less than I used to (2)
- ○ Hardly at all (3)

Q9.14
I get sudden feelings of panic

- ○ Very often indeed (3)
- ○ Quite often (2)
- ○ Not very often (1)
- ○ Not at all (0)

Q9.15
I can enjoy a good book or radio or TV program:

- Often (0)
- Sometimes (1)
- Not often (2)
- Very seldom (3)

End of Block: HADS

Start of Block: VR-12

Q10.1 The following questions ask for your views about your health—how you feel and how well you can do your usual activities.

Q10.2 In general, would you say your health is

- Excellent (1)
- Very Good (2)
- Good (3)
- Fair (4)
- Poor (5)

Q10.3 The following items are about activities you might do during a typical day. Does your health now limit you in these activities? If so, how much?

	Yes, limited a lot (1)	Yes, limited a little (2)	No, not limited at all (3)
a. Moderate activities, such as moving a table, pushing a vacuum cleaner, bowling, or playing golf (1)	○	○	○
b. Climbing several flights of stairs (2)	○	○	○

Q10.4 During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities because of your physical health?

	No, none of the time (1)	Yes, a little of the time (2)	Yes, some of the time (3)	Yes, most of the time (4)	Yes, all the time (5)
a. Accomplished less than you would like (1)	○	○	○	○	○
b. Were limited in the kind of work or other activities (2)	○	○	○	○	○

Q10.5 During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities as a result of any emotional problems (such as feeling depressed or anxious)?

	No, none of the time (1)	Yes, a little of the time (2)	Yes, some of the time (3)	Yes, most of the time (4)	Yes, all of the time (5)
a. Accomplished less than you would like (1)	○	○	○	○	○
b. Didn't do work or other activities as carefully as usual (2)	○	○	○	○	○

Q10.6 During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

○ Not at all (1)

○ A little bit (2)

○ Mo derately (3)

○ Qui te a bit (4)

○ Ext remely (5)

Q10.7 These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please give the one answer that comes closest to the way you have been feeling.

Q10.8 How much of the time during the past 4 weeks:

	All of the time (1)	Most of the time (2)	A good bit of the time (3)	Some of the time (4)	A little of the time (5)	None of the time (6)
a. Have you felt calm and peaceful? (6)	○	○	○	○	○	○
b. Did you have a lot of energy? (7)	○	○	○	○	○	○
c. Have you felt downhearted and blue? (8)	○	○	○	○	○	○

Q10.9 During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

○ All the time (1)

○ Most of the time (2)

○ Some of the time (3)

○ A little of the time (4)

○ None of the time (5)

Q10.10 Now, we'd like to ask you some questions about how your health may have changed.

	Much better (1)	Slightly better (2)	About the same (3)	Slightly worse (4)	Much worse (5)
A. Compared to one year ago, how would you rate your physical health in general now? (1)	○	○	○	○	○
B. Compared to one year ago, how would you rate your emotional problems (such as feeling anxious, depressed or irritable) in general now? (2)	○	○	○	○	○

End of Block: VR-12

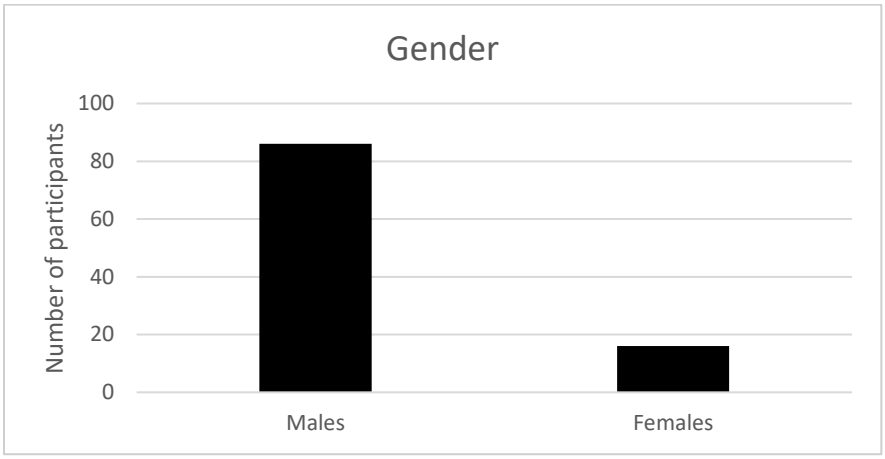
○ Start of Block: Block 10

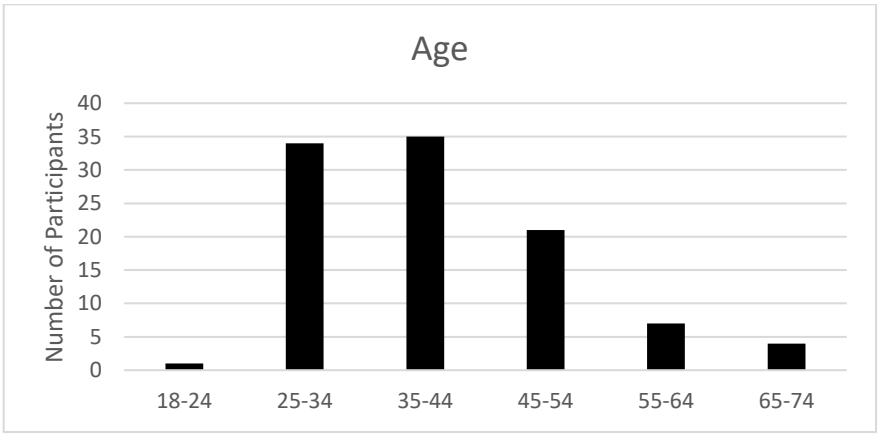
Q11.1 Please enter your email address if you would like to be entered into a drawing for a $50 VISA gift card (this is completely optional).

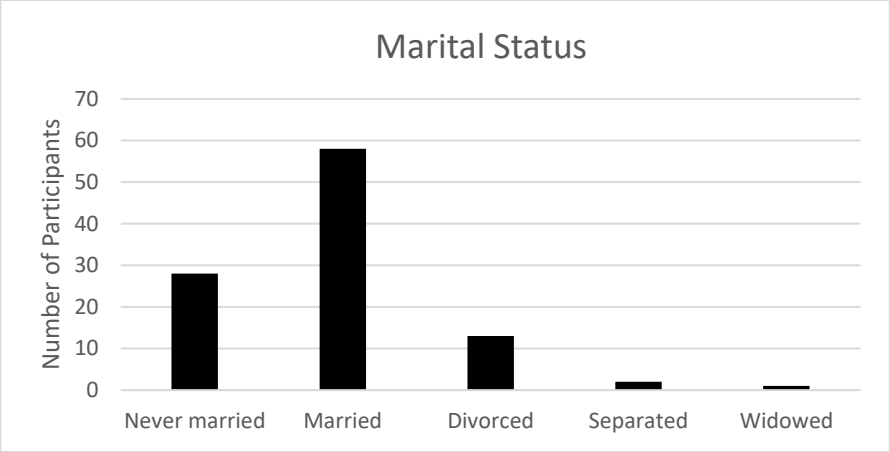
_____

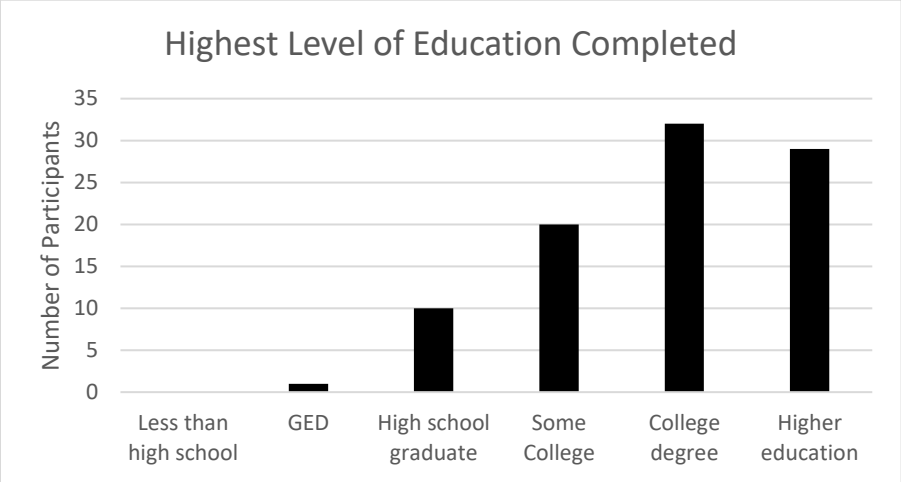
End of Block: Block 10

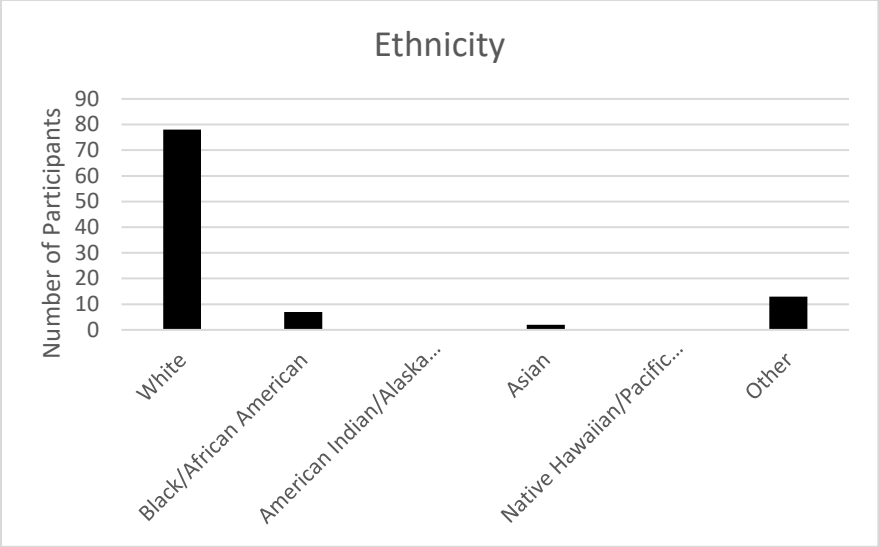
D. DEMOGRAPHIC CHARTS

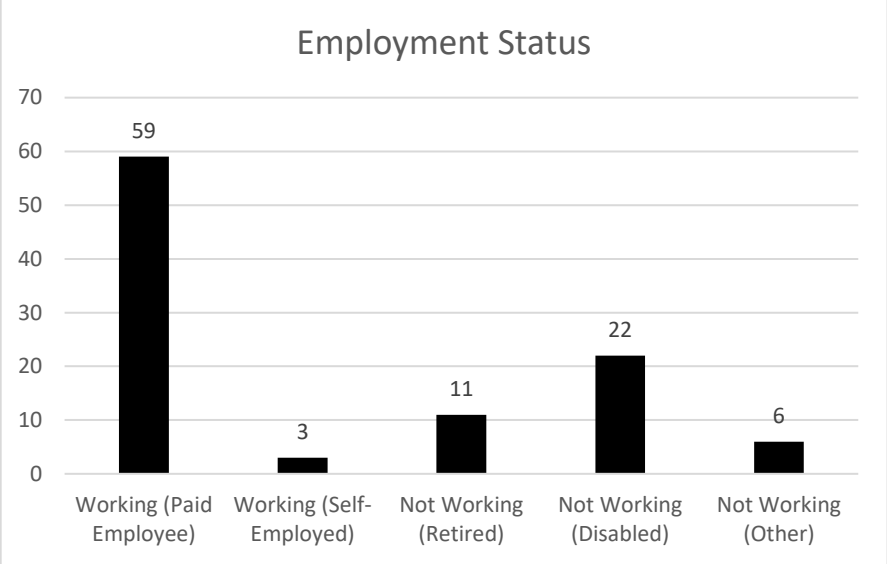


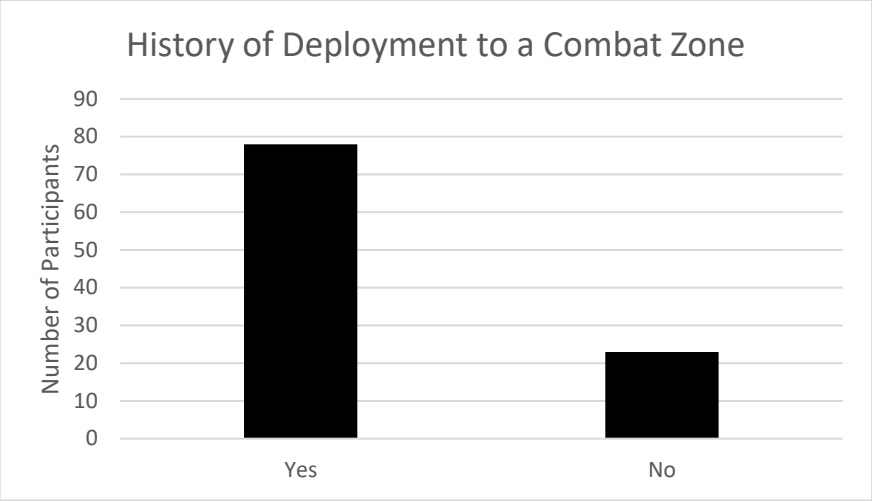


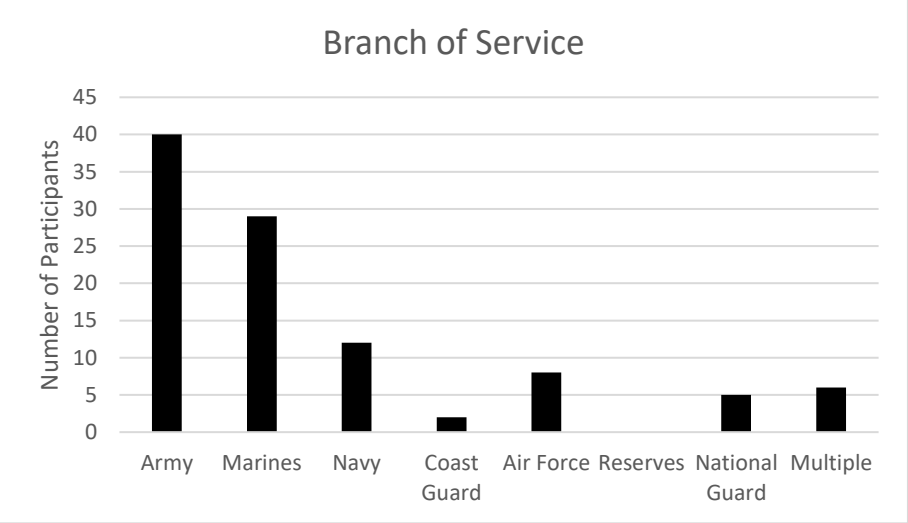

Marital Status
Number of Participants
70
60
50
40
30
20
10
0
Never married
Married
Divorced
Separated
Widowed

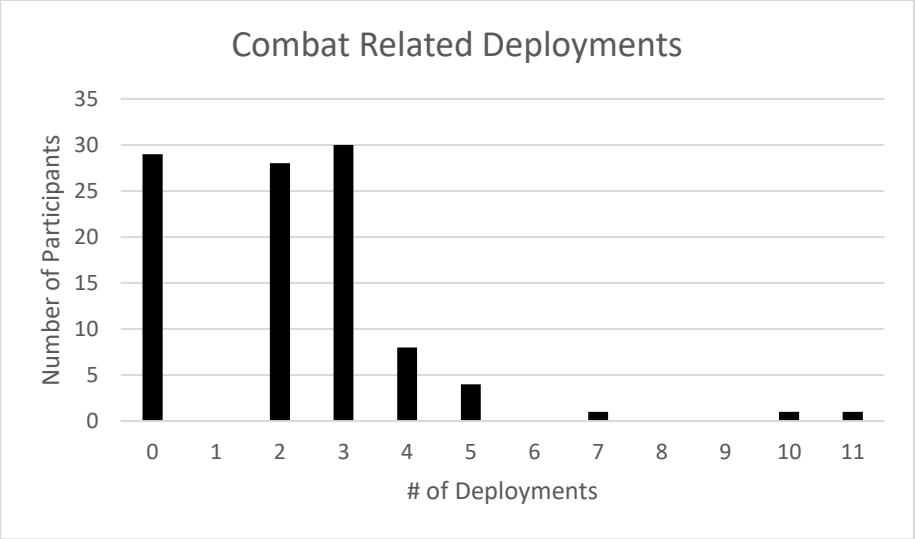

Highest Level of Education Completed
Number of Participants
35
30
25
20
15
10
5
0
Less than high school
GED
High school graduate
Some College
College degree
Higher education

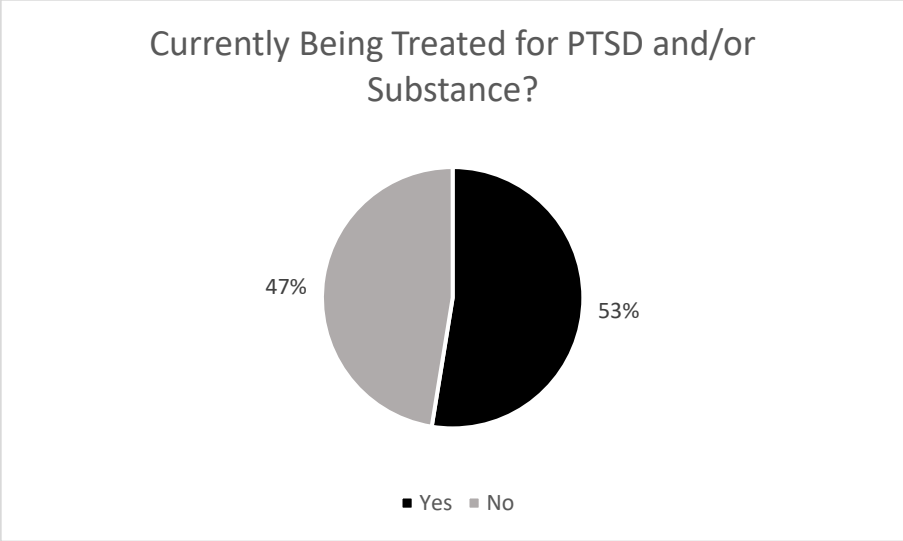

Ethnicity
Number of Participants
90
80
70
60
50
40
30
20
10
0
White
Black/African American
American Indian/Alaska...
Asian
Native Hawaiian/Pacific...
Other

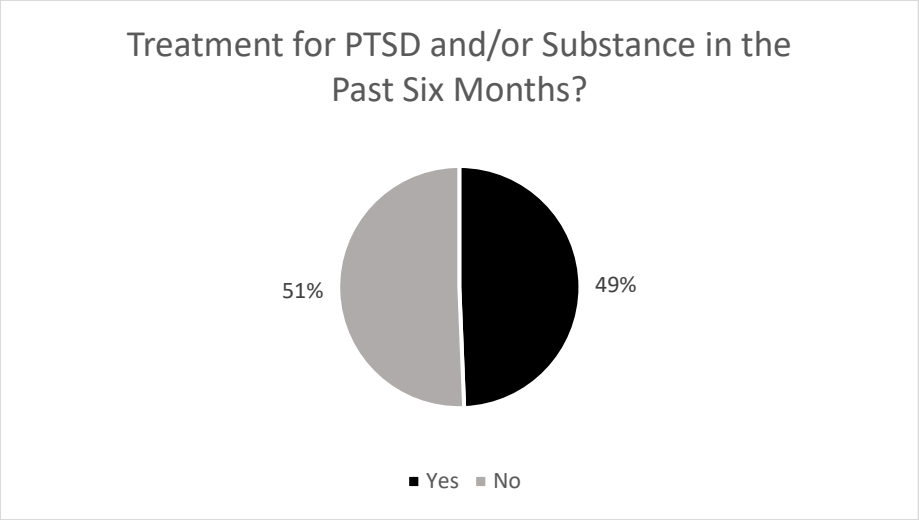

Employment Status
70
60
50
40
30
20
10
0
59
3
11
22
6
Working (Paid Employee)
Working (Self-Employed)
Not Working (Retired)
Not Working (Disabled)
Not Working (Other)


History of Deployment to a Combat Zone
Number of Participants
90
80
70
60
50
40
30
20
10
0
Yes
No


Branch of Service
Number of Participants
45
40
35
30
25
20
15
10
5
0
Army
Marines
Navy
Coast Guard
Air Force
Reserves
National Guard
Multiple


Combat Related Deployments
Number of Participants
35
30
25
20
15
10
5
0
0 1 2 3 4 5 6 7 8 9 10 11
# of Deployments


Currently Being Treated for PTSD and/or Substance?
47%
53%
Yes
No


Treatment for PTSD and/or Substance in the Past Six Months?
51%
49%
Yes
No

E. SPSS DATA OUTPUT

Frequency vs. Self-Perceived Ratings Correlations

Correlations

		Anxiety	Depression	QOL_PHS_C	QOL_MHS_C	QOL_Total_C	MindBodySes	FitnessSes	OutdoorSes	TotalSes
Anxiety	Pearson Correlation	1	.542**	.065	-.514**	-.487**	.082	-.110	-.080	-.064
	Sig. (2-tailed)		.000	.513	.000	.000	.415	.270	.422	.522
	N	102	102	102	102	102	102	102	102	102
Depression	Pearson Correlation	.542**	1	-.222*	-.393**	-.633**	.039	-.362**	-.304**	-.325**
	Sig. (2-tailed)	.000		.025	.000	.000	.700	.000	.002	.001
	N	102	102	102	102	102	102	102	102	102
QOL_PHS_C	Pearson Correlation	.065	-.222*	1	-.519**	.407**	-.036	.339**	.186	.266**
	Sig. (2-tailed)	.513	.025		.000	.000	.723	.000	.061	.007
	N	102	102	102	102	102	102	102	102	102
QOL_MHS_C	Pearson Correlation	-.514**	-.393**	-.519**	1	.570**	-.042	.090	.014	.043
	Sig. (2-tailed)	.000	.000	.000		.000	.673	.366	.889	.667
	N	102	102	102	102	102	102	102	102	102
QOL_Total_C	Pearson Correlation	-.487**	-.633**	.407**	.570**	1	-.079	.422**	.194	.302**
	Sig. (2-tailed)	.000	.000	.000	.000		.428	.000	.051	.002
	N	102	102	102	102	102	102	102	102	102
MindBodySes	Pearson Correlation	.082	.039	-.036	-.042	-.079	1	.150	.124	.572**
	Sig. (2-tailed)	.415	.700	.723	.673	.428		.131	.214	.000
	N	102	102	102	102	102	102	102	102	102
FitnessSes	Pearson Correlation	-.110	-.362**	.339**	.090	.422**	.150	1	.336**	.814**
	Sig. (2-tailed)	.270	.000	.000	.366	.000	.131		.001	.000
	N	102	102	102	102	102	102	102	102	102
OutdoorSes	Pearson Correlation	-.080	-.304**	.186	.014	.194	.124	.336**	1	.647**
	Sig. (2-tailed)	.422	.002	.061	.889	.051	.214	.001		.000
	N	102	102	102	102	102	102	102	102	102
TotalSes	Pearson Correlation	-.064	-.325**	.266**	.043	.302**	.572**	.814**	.647**	1
	Sig. (2-tailed)	.522	.001	.007	.667	.002	.000	.000	.000	
	N	102	102	102	102	102	102	102	102	102

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Duration vs. Self-Perceived Ratings Correlations

Correlations

		Anxiety	Depression	QOL_PHS_C	QOL_MHS_C	QOL_Total_C	DurMindBody	DurFitness	DurOutdoor	TotalDuration
Anxiety	Pearson Correlation	1	.542**	.065	-.361**	-.187	.060	-.202*	-.064	-.074
	Sig. (2-tailed)		.000	.513	.000	.060	.551	.042	.526	.462
	N	102	102	102	102	102	102	102	102	102
Depression	Pearson Correlation	.542**	1	-.222*	-.317**	-.422**	.002	-.378**	-.133	-.189
	Sig. (2-tailed)	.000		.025	.001	.000	.984	.000	.181	.058
	N	102	102	102	102	102	102	102	102	102
QOL_PHS_C	Pearson Correlation	.065	-.222*	1	-.256**	.749**	-.100	.298**	-.073	-.011
	Sig. (2-tailed)	.513	.025		.009	.000	.316	.002	.466	.913
	N	102	102	102	102	102	102	102	102	102
QOL_MHS_C	Pearson Correlation	-.361**	-.317**	-.256**	1	.449**	.080	.178	.267**	.275**
	Sig. (2-tailed)	.000	.001	.009		.000	.426	.074	.007	.005
	N	102	102	102	102	102	102	102	102	102
QOL_Total_C	Pearson Correlation	-.187	-.422**	.749**	.449**	1	-.038	.398**	.115	.179
	Sig. (2-tailed)	.060	.000	.000	.000		.704	.000	.248	.072
	N	102	102	102	102	102	102	102	102	102
DurMindBody	Pearson Correlation	.060	.002	-.100	.080	-.038	1	.010	.200*	.529**
	Sig. (2-tailed)	.551	.984	.316	.426	.704		.921	.044	.000
	N	102	102	102	102	102	102	102	102	102
DurFitness	Pearson Correlation	-.202*	-.378**	.298**	.178	.398**	.010	1	.143	.417**
	Sig. (2-tailed)	.042	.000	.002	.074	.000	.921		.153	.000
	N	102	102	102	102	102	102	102	102	102
DurOutdoor	Pearson Correlation	-.064	-.133	-.073	.267**	.115	.200*	.143	1	.810**
	Sig. (2-tailed)	.526	.181	.466	.007	.248	.044	.153		.000
	N	102	102	102	102	102	102	102	102	102
TotalDuration	Pearson Correlation	-.074	-.189	-.011	.275**	.179	.529**	.417**	.810**	1
	Sig. (2-tailed)	.462	.058	.913	.005	.072	.000	.000	.000	
	N	102	102	102	102	102	102	102	102	102

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Intensity vs. Self-Perceived Ratings Correlations

Correlations

		Anxiety	Depression	QOL_PHS_C	QOL_MHS_C	QOL_Total_C	Strenuous	Moderate	Mild
Anxiety	Pearson Correlation	1	.542**	.065	-.514**	-.487**	-.042	.043	.058
	Sig. (2-tailed)		.000	.513	.000	.000	.677	.667	.563
	N	102	102	102	102	102	102	102	102
Depression	Pearson Correlation	.542**	1	-.222*	-.393**	-.633**	-.256**	-.100	-.035
	Sig. (2-tailed)	.000		.025	.000	.000	.009	.318	.727
	N	102	102	102	102	102	102	102	102
QOL_PHS_C	Pearson Correlation	.065	-.222*	1	-.519**	.407**	.306**	.180	.096
	Sig. (2-tailed)	.513	.025		.000	.000	.002	.070	.338
	N	102	102	102	102	102	102	102	102
QOL_MHS_C	Pearson Correlation	-.514**	-.393**	-.519**	1	.570**	.104	-.066	-.059
	Sig. (2-tailed)	.000	.000	.000		.000	.296	.512	.555
	N	102	102	102	102	102	102	102	102
QOL_Total_C	Pearson Correlation	-.487**	-.633**	.407**	.570**	1	.406**	.103	.029
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.304	.773
	N	102	102	102	102	102	102	102	102
Strenuous	Pearson Correlation	-.042	-.256**	.306**	.104	.406**	1	.522**	.206*
	Sig. (2-tailed)	.677	.009	.002	.296	.000		.000	.037
	N	102	102	102	102	102	102	102	102
Moderate	Pearson Correlation	.043	-.100	.180	-.066	.103	.522**	1	.385**
	Sig. (2-tailed)	.667	.318	.070	.512	.304	.000		.000
	N	102	102	102	102	102	102	102	102
Mild	Pearson Correlation	.058	-.035	.096	-.059	.029	.206*	.385**	1
	Sig. (2-tailed)	.563	.727	.338	.555	.773	.037	.000	
	N	102	102	102	102	102	102	102	102

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Average Self-Perceived Rating based on Activity Preference

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Anxiety	Between Groups	89.028	2	44.514	2.189	.117
	Within Groups	2012.825	99	20.332		
	Total	2101.853	101			
Depression	Between Groups	.796	2	.398	.018	.982
	Within Groups	2132.704	99	21.542		
	Total	2133.500	101			
QOL_PHS_C	Between Groups	724.867	2	362.433	2.168	.120
	Within Groups	16550.477	99	167.177		
	Total	17275.343	101			
QOL_MHS_C	Between Groups	215.298	2	107.649	.504	.605
	Within Groups	21127.878	99	213.413		
	Total	21343.176	101			
QOL_Total_C	Between Groups	1665.290	2	832.645	4.842	.010
	Within Groups	17023.583	99	171.955		
	Total	18688.873	101			

Multiple Comparisons

Tukey HSD

Dependent Variable	(I) Preference	(J) Preference	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Anxiety	1	2	-1.012	.946	.535	-3.26	1.24
		3	-3.151	1.559	.113	-6.86	.56
	2	1	1.012	.946	.535	-1.24	3.26
		3	-2.139	1.590	.374	-5.92	1.65
	3	1	3.151	1.559	.113	-.56	6.86
		2	2.139	1.590	.374	-1.65	5.92
Depression	1	2	-.174	.974	.983	-2.49	2.14
		3	-.188	1.605	.992	-4.01	3.63
	2	1	.174	.974	.983	-2.14	2.49
		3	-.015	1.637	1.000	-3.91	3.88
	3	1	.188	1.605	.992	-3.63	4.01
		2	.015	1.637	1.000	-3.88	3.91
QOL_PHS_C	1	2	3.133	2.712	.483	-3.32	9.59
		3	8.855	4.472	.122	-1.79	19.50
	2	1	-3.133	2.712	.483	-9.59	3.32
		3	5.722	4.560	.424	-5.13	16.57
	3	1	-8.855	4.472	.122	-19.50	1.79
		2	-5.722	4.560	.424	-16.57	5.13
QOL_MHS_C	1	2	2.584	3.064	.677	-4.71	9.88
		3	3.806	5.052	.732	-8.22	15.83
	2	1	-2.584	3.064	.677	-9.88	4.71
		3	1.222	5.152	.969	-11.04	13.48
	3	1	-3.806	5.052	.732	-15.83	8.22
		2	-1.222	5.152	.969	-13.48	11.04
QOL_Total_C	1	2	5.717	2.751	.100	-.83	12.26
		3	12.661*	4.535	.017	1.87	23.45
	2	1	-5.717	2.751	.100	-12.26	.83
		3	6.944	4.625	.295	-4.06	17.95
	3	1	-12.661*	4.535	.017	-23.45	-1.87
		2	-6.944	4.625	.295	-17.95	4.06

*. The mean difference is significant at the 0.05 level.

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Anxiety	1	51	9.55	4.614	.646	8.25	10.85	0	18
	2	41	10.56	4.648	.726	9.09	12.03	0	21
	3	10	12.70	3.057	.967	10.51	14.89	8	17
	Total	102	10.26	4.562	.452	9.37	11.16	0	21
Depression	1	51	7.41	4.859	.680	6.05	8.78	0	19
	2	41	7.59	4.416	.690	6.19	8.98	0	21
	3	10	7.60	4.377	1.384	4.47	10.73	1	13
	Total	102	7.50	4.596	.455	6.60	8.40	0	21
QOL_PHS_C	1	51	45.25	12.728	1.782	41.68	48.83	15	66
	2	41	42.12	12.568	1.963	38.15	46.09	17	61
	3	10	36.40	15.393	4.868	25.39	47.41	16	62
	Total	102	43.13	13.078	1.295	40.56	45.70	15	66
QOL_MHS_C	1	51	39.71	17.810	2.494	34.70	44.72	22	94
	2	41	37.12	10.937	1.708	33.67	40.57	15	78
	3	10	35.90	7.325	2.316	30.66	41.14	22	46
	Total	102	38.29	14.537	1.439	35.44	41.15	15	94
QOL_Total_C	1	51	84.96	14.742	2.064	80.81	89.11	59	126
	2	41	79.24	11.022	1.721	75.76	82.72	48	106
	3	10	72.30	12.010	3.798	63.71	80.89	49	92
	Total	102	81.42	13.603	1.347	78.75	84.09	48	126

QOL_Total_C

Tukey HSD[a,b]

Preference	N	Subset for alpha = 0.05	
		1	2
3	10	72.30	
2	41	79.24	79.24
1	51		84.96
Sig.		.207	.341

Means for groups in homogeneous subsets are displayed.

a. Uses Harmonic Mean Sample Size = 20.834.

b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Average Self-Perceived Rating based on Gender

Group Statistics

	Gender	N	Mean	Std. Deviation	Std. Error Mean
Anxiety	1	86	9.92	4.507	.486
	2	16	12.13	4.544	1.136
Depression	1	86	7.45	4.794	.517
	2	16	7.75	3.454	.864
QoL	1	86	30.47	12.004	1.294
	2	16	35.31	10.058	2.514

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference			
Anxiety	Equal variances assumed	.023	.879	-1.796	100	.076	-2.206			
	Equal variances not assumed			-1.786	20.869	.089	-2.206			
Depression	Equal variances assumed	1.408	.238	-.236	100	.814	-.297			
	Equal variances not assumed			-.295	27.061	.771	-.297			
QoL	Equal variances assumed	.336	.563	-1.518	100	.132	-4.847			
	Equal variances not assumed			-1.714	23.709	.100	-4.847			

Average Self-Perceived Rating & Age / Service Correlation

Correlations

		Anxiety	Depression	QoL	Age	Service
Anxiety	Pearson Correlation	1	.542**	.543**	-.029	.115
	Sig. (2-tailed)		.000	.000	.769	.265
	N	102	102	102	102	96
Depression	Pearson Correlation	.542**	1	.544**	.199*	.186
	Sig. (2-tailed)	.000		.000	.045	.070
	N	102	102	102	102	96
QoL	Pearson Correlation	.543**	.544**	1	.084	.040
	Sig. (2-tailed)	.000	.000		.403	.701
	N	102	102	102	102	96
Age	Pearson Correlation	-.029	.199*	.084	1	-.043
	Sig. (2-tailed)	.769	.045	.403		.680
	N	102	102	102	102	96
Service	Pearson Correlation	.115	.186	.040	-.043	1
	Sig. (2-tailed)	.265	.070	.701	.680	
	N	96	96	96	96	96

Average Self-Perceived Rating & Age / $ of Times Deployed Correlation

Correlations

		Anxiety	Depression	QoL	Age	DeployedHowMany
Anxiety	Pearson Correlation	1	.542**	.543**	-.029	.006
	Sig. (2-tailed)		.000	.000	.769	.959
	N	102	102	102	102	73
Depression	Pearson Correlation	.542**	1	.544**	.199*	-.036
	Sig. (2-tailed)	.000		.000	.045	.765
	N	102	102	102	102	73
QoL	Pearson Correlation	.543**	.544**	1	.084	.015
	Sig. (2-tailed)	.000	.000		.403	.900
	N	102	102	102	102	73
Age	Pearson Correlation	-.029	.199*	.084	1	.073
	Sig. (2-tailed)	.769	.045	.403		.540
	N	102	102	102	102	73
DeployedHowMany	Pearson Correlation	.006	-.036	.015	.073	1
	Sig. (2-tailed)	.959	.765	.900	.540	
	N	73	73	73	73	73

Average Self-Perceived Rating Based on Having Been Deployed

Group Statistics

	DeployedYN	N	Mean	Std. Deviation	Std. Error Mean
Anxiety	1	78	10.41	4.689	.531
	2	23	9.61	4.175	.871
Depression	1	78	7.41	4.725	.535
	2	23	7.74	4.319	.901
QoL	1	78	30.41	12.575	1.424
	2	23	33.83	8.747	1.824

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference			
Anxiety	Equal variances assumed	.362	.549	.738	99	.462	.802			
	Equal variances not assumed			.786	39.833	.436	.802			
Depression	Equal variances assumed	.772	.382	-.299	99	.766	-.329			
	Equal variances not assumed			-.314	38.880	.755	-.329			
QoL	Equal variances assumed	2.305	.132	-1.217	99	.227	-3.416			
	Equal variances not assumed			-1.476	51.520	.146	-3.416			

Average Self-Perceived Rating Based on Currently Being Treated

Group Statistics

	CurrentTX	N	Mean	Std. Deviation	Std. Error Mean
Anxiety	1	41	11.27	3.937	.615
	2	37	9.35	5.154	.847
Depression	1	41	9.10	4.005	.625
	2	37	5.65	4.837	.795
QoL	1	41	32.24	11.621	1.815
	2	37	28.46	13.453	2.212

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference			
Anxiety	Equal variances assumed	3.643	.060	1.856	76	.067	1.917			
	Equal variances not assumed			1.831	67.139	.072	1.917			
Depression	Equal variances assumed	1.902	.172	3.442	76	.001	3.449			
	Equal variances not assumed			3.409	70.154	.001	3.449			
QoL	Equal variances assumed	1.017	.316	1.333	76	.187	3.784			
	Equal variances not assumed			1.323	71.591	.190	3.784			

Average Self-Perceived Rating Based on Treatment Within the Past Six Months

Group Statistics

	TXin6mos	N	Mean	Std. Deviation	Std. Error Mean
Anxiety	Yes	39	11.44	3.844	.616
	No	40	9.50	5.238	.828
Depression	Yes	39	8.79	4.354	.697
	No	40	6.10	4.689	.741
QoL	Yes	39	34.13	10.940	1.752
	No	40	26.90	13.026	2.060

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference			
Anxiety	Equal variances assumed	6.480	.013	1.869	77	.065	1.936			
	Equal variances not assumed			1.876	71.575	.065	1.936			
Depression	Equal variances assumed	.291	.591	2.645	77	.010	2.695			
	Equal variances not assumed			2.648	76.819	.010	2.695			
QoL	Equal variances assumed	1.950	.167	2.667	77	.009	7.228			
	Equal variances not assumed			2.673	75.361	.009	7.228			

Frequency of Sessions Correlations with BAM/PCL-M

Correlations

		MindBodySes	FitnessSes	OutdoorSes	TotalSes	BAMuse	BAMrisk	BAMprotect	PCLMM
MindBodySes	Pearson Correlation	1	.144	.124	.572**	-.119	.011	.033	.064
	Sig. (2-tailed)		.150	.214	<.001	.233	.911	.745	.524
	N	102	101	102	102	102	102	102	102
FitnessSes	Pearson Correlation	.144	1	.351**	.813**	-.145	-.359**	.160	-.017
	Sig. (2-tailed)	.150		<.001	<.001	.148	<.001	.110	.862
	N	101	101	101	101	101	101	101	101
OutdoorSes	Pearson Correlation	.124	.351**	1	.647**	-.037	-.127	-.032	-.065
	Sig. (2-tailed)	.214	<.001		<.001	.711	.202	.753	.515
	N	102	101	102	102	102	102	102	102
TotalSes	Pearson Correlation	.572**	.813**	.647**	1	-.147	-.264**	.093	-.020
	Sig. (2-tailed)	<.001	<.001	<.001		.142	.007	.351	.841
	N	102	101	102	102	102	102	102	102
BAMuse	Pearson Correlation	-.119	-.145	-.037	-.147	1	.239*	-.238*	-.128
	Sig. (2-tailed)	.233	.148	.711	.142		.016	.016	.200
	N	102	101	102	102	102	102	102	102
BAMrisk	Pearson Correlation	.011	-.359**	-.127	-.264**	.239*	1	-.006	.413**
	Sig. (2-tailed)	.911	<.001	.202	.007	.016		.953	<.001
	N	102	101	102	102	102	102	102	102
BAMprotect	Pearson Correlation	.033	.160	-.032	.093	-.238*	-.006	1	-.077
	Sig. (2-tailed)	.745	.110	.753	.351	.016	.953		.443
	N	102	101	102	102	102	102	102	102
PCLMM	Pearson Correlation	.064	-.017	-.065	-.020	-.128	.413**	-.077	1
	Sig. (2-tailed)	.524	.862	.515	.841	.200	<.001	.443	
	N	102	101	102	102	102	102	102	102

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Duration of Sessions Correlations with BAM/PCL-M

Correlations

		BAMuse	BAMrisk	BAMprotect	PCLMM	DurFitness	DurMindBody	DurOutdoor	TotalDurSections
BAMuse	Pearson Correlation	1	.239*	-.238*	-.128	-.096	-.163	-.168	-.234*
	Sig. (2-tailed)		.016	.016	.200	.354	.115	.098	.024
	N	102	102	102	102	95	95	98	94
BAMrisk	Pearson Correlation	.239*	1	-.006	.413**	-.366**	.003	-.062	-.149
	Sig. (2-tailed)	.016		.953	<.001	<.001	.979	.547	.151
	N	102	102	102	102	95	95	98	94
BAMprotect	Pearson Correlation	-.238*	-.006	1	-.077	.137	.041	-.125	-.049
	Sig. (2-tailed)	.016	.953		.443	.186	.696	.218	.639
	N	102	102	102	102	95	95	98	94
PCLMM	Pearson Correlation	-.128	.413**	-.077	1	-.151	.053	-.057	-.063
	Sig. (2-tailed)	.200	<.001	.443		.144	.609	.577	.550
	N	102	102	102	102	95	95	98	94
DurFitness	Pearson Correlation	-.096	-.366**	.137	-.151	1	-.049	.101	.332**
	Sig. (2-tailed)	.354	<.001	.186	.144		.642	.332	.001
	N	95	95	95	95	95	94	95	94
DurMindBody	Pearson Correlation	-.163	.003	.041	.053	-.049	1	.037	.521**
	Sig. (2-tailed)	.115	.979	.696	.609	.642		.719	<.001
	N	95	95	95	95	94	95	95	94
DurOutdoor	Pearson Correlation	-.168	-.062	-.125	-.057	.101	.037	1	.826**
	Sig. (2-tailed)	.098	.547	.218	.577	.332	.719		<.001
	N	98	98	98	98	95	95	98	94
TotalDurSections	Pearson Correlation	-.234*	-.149	-.049	-.063	.332**	.521**	.826**	1
	Sig. (2-tailed)	.024	.151	.639	.550	.001	<.001	<.001	
	N	94	94	94	94	94	94	94	94

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Intensity Correlations with BAM/PCL-M

Correlations

		BAMuse	BAMrisk	BAMprotect	PCLMM	Strenuous	Moderate	Mild
BAMuse	Pearson Correlation	1	.239*	-.238*	-.128	.097	.014	-.075
	Sig. (2-tailed)		.016	.016	.200	.335	.886	.458
	N	102	102	102	102	100	100	99
BAMrisk	Pearson Correlation	.239*	1	-.006	.413**	-.088	.162	.048
	Sig. (2-tailed)	.016		.953	<.001	.382	.107	.635
	N	102	102	102	102	100	100	99
BAMprotect	Pearson Correlation	-.238*	-.006	1	-.077	.190	.149	.166
	Sig. (2-tailed)	.016	.953		.443	.058	.139	.100
	N	102	102	102	102	100	100	99
PCLMM	Pearson Correlation	-.128	.413**	-.077	1	.006	.101	.015
	Sig. (2-tailed)	.200	<.001	.443		.952	.315	.881
	N	102	102	102	102	100	100	99
Strenuous	Pearson Correlation	.097	-.088	.190	.006	1	.511**	.210*
	Sig. (2-tailed)	.335	.382	.058	.952		<.001	.038
	N	100	100	100	100	100	100	98
Moderate	Pearson Correlation	.014	.162	.149	.101	.511**	1	.368**
	Sig. (2-tailed)	.886	.107	.139	.315	<.001		<.001
	N	100	100	100	100	100	100	98
Mild	Pearson Correlation	-.075	.048	.166	.015	.210*	.368**	1
	Sig. (2-tailed)	.458	.635	.100	.881	.038	<.001	
	N	99	99	99	99	98	98	99

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

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